ANNALS OF SURGERY

ORIGINAL MEMOIRS.

RADICAL OPERATIONS FOR THE CURE OF CANCER OF THE PYLORIC END OF THE STOMACH.

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SEVENTY per cent. of all gastric carcinomata involve the pyloric portion and 60 per cent. have their origin at the pylorus or within three inches of it. Considering the fact that radical operation was successfully performed in the time of Billroth (1881), before the inception of modern abdominal surgery, and that during the succeeding twenty-two years more or less work has been done in this field, it is curious that pylorectomy and partial gastrectomy have not as yet achieved an accepted surgical position. There have been a number of reasons for this anomaly; first, a belief that the diagnosis could not be made before the case had advanced beyond the possibility of cure, and, second, that the operation was difficult, prolonged, and bloody, with an almost prohibitive mortality. The first proposition is to a considerable extent true, but not entirely so, as we have in exploratory incision the one diagnostic resource which is reliable, and which must be resorted to in the large majority of cases before a surgical diagnosis can be made.

Without it the truth is but slowly established, at the expense of progressive hopeless involvement. Exploration can be safely accomplished through a small incision and with a short time of disability. It is said that the patient will not submit to an abdominal incision upon suspicion. Herein we do the intelligence of the public an injustice; we have seldom been refused the opportunity, when the matter has been fairly and candidly laid before the patient and his friends. The plea for delay has more often come from the attending physician.

Without going into the question as to the symptoms which would constitute a basis for exploration, the writer would express the opinion that the early diagnosis must be based upon clinical phenomena, the result of observation and experience.

In attempting to solve some of these problems, we have encountered a number of misleading statements which seem to have been generally accepted. Of these three are of sufficient importance to deserve brief discussion: (a) The value of laboratory methods of diagnosis; (b) The significance of palpable tumor; (c) The history of previous ulcer.

(a) Laboratory methods of diagnosis are chiefly based upon chemistry of the gastric secretions (test meals and so forth) and the microscopical examination and chemical reactions of gastric "findings," as well as the urine, fæces, and blood. In the surgical stage these examinations have little value, but gain in the diagnostic importance with the progress of the disease to become of the greatest value only when the patient is in hopeless condition. My colleagues, Drs. Graham and Millet, in the examination of somewhat over 1500 stomach and duodenal cases, of which 430 came to operative demonstration, showed this beyond question. These examinations should be made, but exploration should not be delayed by reason of the inconclusive nature of the results.

(b) Tumor. The dictum was advanced many years ago that the presence of a tumor of itself demonstrated inoperability. This is by no means true; a small movable tumor in the pyloric region may be a favorable indication. The early diagnosis of cancer depends in a great measure upon the introduc-

tion of mechanical phenomena from obstruction at the pylorus, with or without palpable tumor; and it is the interference with gastric motility which early calls the attention of the patient to his trouble, and not the presence of the cancer itself. Without these symptoms a surgical diagnosis would seldom be made. In our experience, the patient with marked symptoms of cancer of the stomach, but without any evidence of pyloric obstruction, proves on exploration to be the victim of advanced and hopeless disease of the body, in which there were no symptoms during the operable period.

(c) A history of previous ulcer with complete recovery during a prolonged period of time is apt to be taken as an indication that a present gastric trouble is due to a recurrence of the ulcer and lead the patient and attendant physician to postpone interference. Usually this is true, but too often the renewal of symptoms is due to cancer development upon an ulcer base. We have had this occur a number of times. The author has become a convert to the belief that cancer frequently develops upon an old ulcer scar. Graham, in 145 cases of cancer of the stomach which came to operation at our hands, found a previous history of ulcer in 60 per cent. of the cases, although years may have elapsed after healing of the ulcer before the cancer began. Lebert says that 9 per cent. of ulcers develop cancer, that is, pass directly from the one condition to the other. Ochsner, Futterer, Dunn, and others believe that the irritation of healed ulcer defects in the mucosa furnishes the starting-point for the majority of cancers. Murphy rightly says that precancerous lesions can usually be demonstrated in the history of the case. It is to be noted that the geography of cancer and ulcer is nearly identical.

The second proposition concerns the ulcer itself. There are two local manifestations of the malignant process upon which the advisability of operation depends,—(a) local extent of disease, (b) lymphatic involvement.

(a) Movability of the growth is a very important factor in judging of the extent of disease. Limitation to the pyloric end of the stomach is also of prime importance. Extension to

neighboring organs usually contraindicates operation, with the occasional exception of the transverse mesocolon. The duodenum is rarely involved to any considerable extent. Adhesions are a serious complication not only because they are the advance guard of the cancerous process, but in that they add to the difficulties and dangers of the operation. Haberkant found a death-rate of 73 per cent. operated upon in the face of extensive adhesions and 27 per cent. without such complication. Mikulicz had a mortality of 70 per cent. when there was close adhesion to the pancreas. A moderate amount of adhesions which permit of free motility of the growth has not materially influenced the prognosis in our experience.

(b) Lymphatic infection. This is the most important element in the attempt at cure of cancer of the stomach because the most difficult to estimate of its extent. The mere presence of enlarged lymph nodes does not necessarily imply cancer. Glandular hyperplasia occurs with great frequency in ulcer as the result of infection, and the location of such lymph nodes may lead to the site of ulceration as pointed out by Lund. Ulcerating gastric carcinomata may give rise to infected glands without epithelial invasion, but in practically all cases of gastric cancer the lymphatic structures are involved. In the Breslau clinic, twenty cases out of twenty-one showed glandular involvement. In a general way the lymph channels follow the blood-vessels. On the lesser curvature the blood- and lymph-vessels lie in the wall of the stomach itself, and, as pointed out by Mikulicz, it is necessary in every case of pyloric cancer to remove all of the lesser curvature to the gastric artery. For convenience, this situation on the lesser curvature for the beginning of the line of excision may be called the Mikulicz point of election. We owe a debt of gratitude to Cuneo for his masterly exposition of the lymph drainage of the stomach. He showed that there are but few lymph glands along the greater curvature, and these are confined to the pyloric region. (Fig. 1.) These glands, with the blood-vessels, are set at some distance from the greater curvature, thus enabling rapid expansion and contraction of the stomach, without interference with

Pneumogastric left

Ganglion

Pneumogastric
right

Coronary artery

Coronary vein

Ganglion

Hepatic artery

Gastro-epiploic
artery

Ganglion

Gastro-epiploic
vein

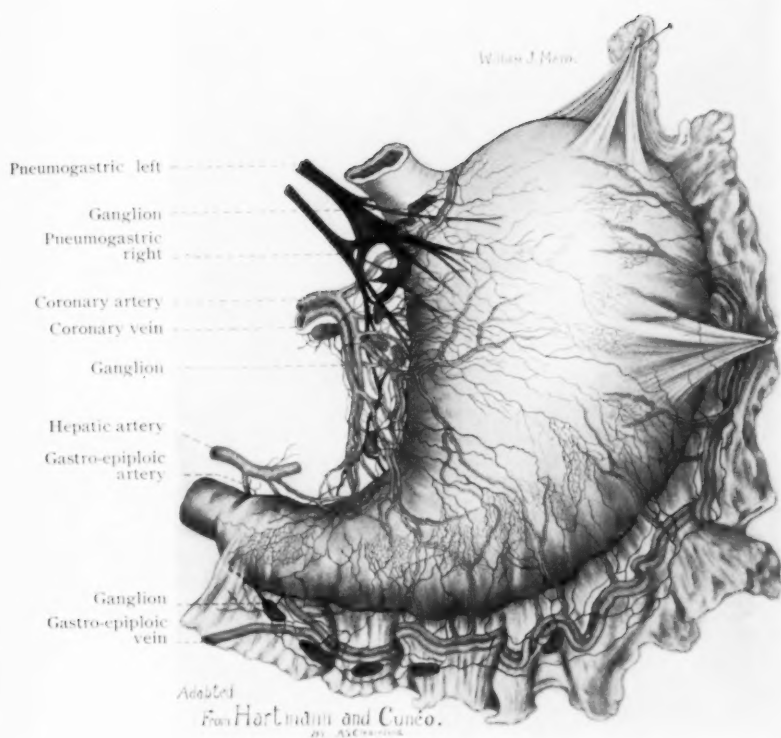Adapted
From Hartmann and Cunéo.

FIG. 1.—Showing anatomy of the stomach with especial reference to
distribution of the lymphatics.

the circulation. The lymph stream in this situation flows from left to right, and does not drain more than one-third of the adjacent stomach, two-thirds going into the lymph channels of the lesser curvature. In the immediate vicinity of the pylorus, however, it drains its fair share. The lymphatics of the greater and lesser curvatures enter the deep receiving glands about the cœliac axis on the anterior surface of the aorta. Cuneo practically demonstrated that the fundus and two-thirds of the greater curvature are free from lymphatic involvement in cancer of the pylorus. Hartmann at once seized upon this basic principle and fixed the point of election for the line of section upon the greater curvature at a healthy place on the gastric wall, to the left of these glands. The distance to the left is regulated by the extent of disease. In a previous communication the author called attention to the lymphatic isolation of the dome of the stomach. This has also been noted by Robson and Moynihan. It is evident that the extent of this free zone along the greater curvature is much wider in pyloric cancer than was at that time considered possible. The retention of this portion of the stomach relieves the operation of many serious difficulties without loss of completeness.

The operation itself can be divided into: (*a*) Incision and exposure; (*b*) Control of hæmorrhage; (*c*) Closing of the stomach and duodenal stumps; (*d*) Re-establishment of the gastro-intestinal canal; (*e*) Avoidance of infection; (*f*) Measures for preventing shock.

The patient's stomach should be cleaned the day before rather than immediately previous to operation, as it may prove to be rather trying to one unaccustomed to the process. A small amount of liquid nourishment may be given after the lavage, but nothing on the morning of the operation. The teeth and mouth should have been previously cleansed as well as possible. A preliminary hypodermatic injection of morphine, to enable the anæsthetic to be reduced to a minimum, may be of value.

(A) A small incision is made in the median line, half-way between the ensiform cartilage and the umbilicus; through this

two fingers are introduced for exploration.   If the condition
is inoperable, the incision is closed, and a sufficient number of
buried non-absorbable mattress sutures of silk, linen, or wire,
introduced into the aponeurotic structure of the linea alba to
enable the patient to get about at once and to return to his
friends within a few days.   If sutured in the usual manner, and
the patient placed in bed for two or three weeks, many of them
will develop hypostatic pulmonary lesions, loss of appetite,
swelling of the feet, and general debility, and may be unable to
spend their few remaining days at home.   When an advanced
cancer case goes to bed for a week or two, the chances of his
getting about again are small.

Non-absorbable sutures, buried in fixed structures such as
fascia and bone, seldom give trouble, and furnish immediate
strength.   In muscle and movable tissues, atrophy necrosis
may occur.   We limit their use, however, to the hopeless cases
of exploration for malignant disease.   If operation is decided
upon, the small exploring incision is rapidly enlarged to four
or five inches, and a sufficiency of the gastrohepatic omentum
is tied off at once close to the liver.   This opens the lesser
cavity of the peritoneum and mobilizes the pyloric end of the
stomach with tumor.   The entire area is now packed off with
gauze pads.

(B) Control of hæmorrhage.   The pyloric end of the
stomach is supplied by four blood-vessels,—the gastric and
superior pyloric above, and the right and left gastro-epiploics
below.   By ligating these four vessels early, the operation is
rendered practically bloodless.   The gastric is doubly tied
about one inch below the cardiac orifice at a point where it
joins the lesser curvature and divided between the ligatures.
The superior pyloric is doubly tied and divided.   The fingers
are passed beneath the pylorus, raising the gastrocolic omen-
tum from the transverse mesocolon, and in this way safe liga-
tion behind the pylorus of the right gastro-epiploic artery, or
in most cases its parent vessel, the gastroduodenal, is secured.
(Fig. 2.)   The left gastro-epiploic is now tied at an appro-
priate point, and the necessary amount of gastrocolic omentum
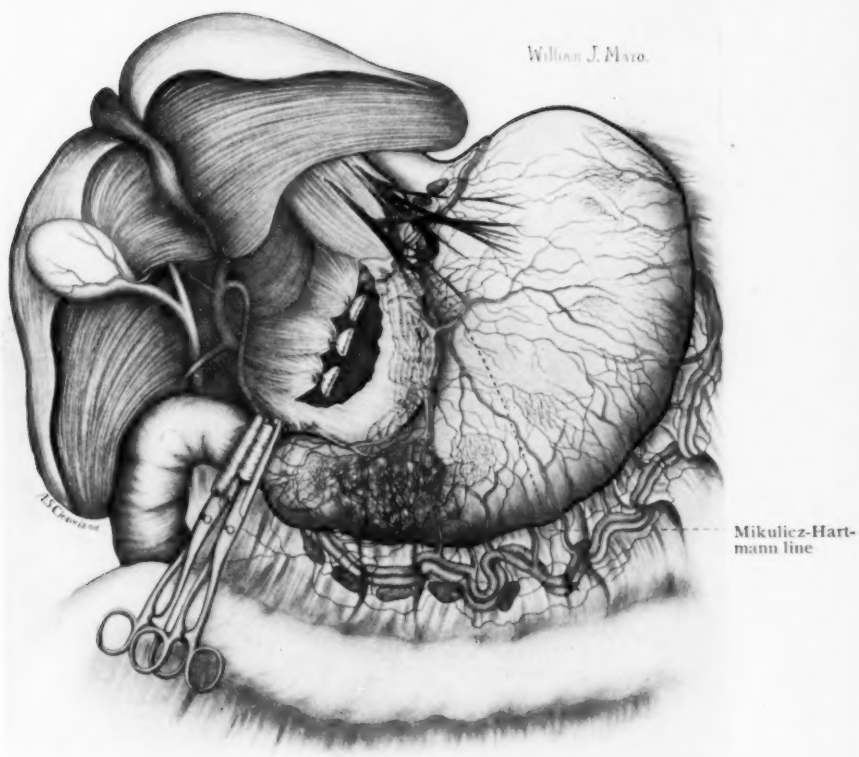
William J. Mayo.

Mikulicz-Hart-
mann line

FIG. 2 —Showing ligation of gastrohepatic omentum and superior vessels in such manner as to leave all the lymph nodes attached to the part of the stomach to be excised; also lines of division of duodenum and stomach.
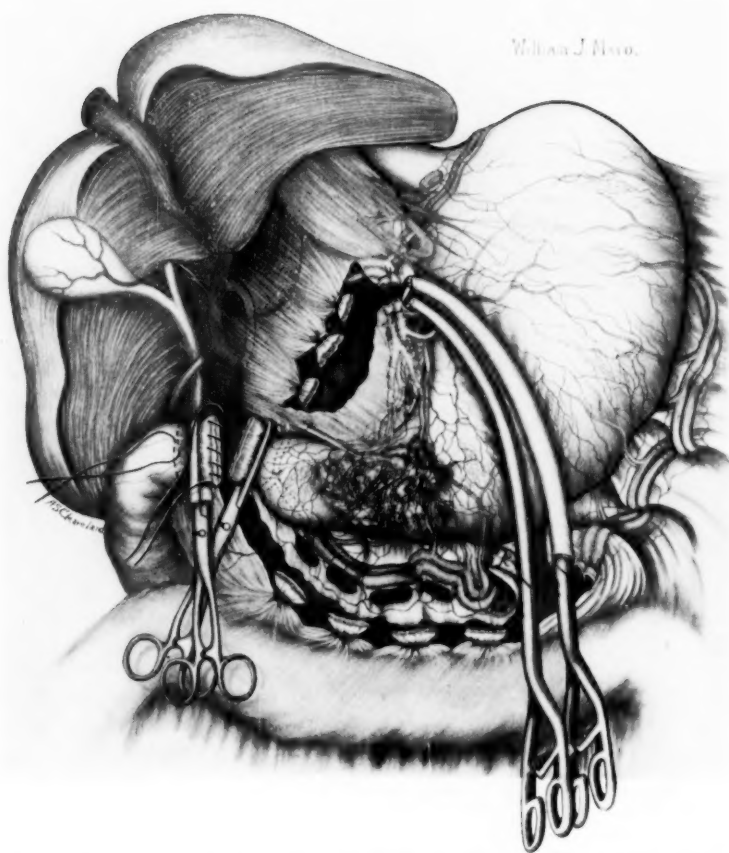
FIG. 3.—Showing methods of excision. Note that all the glands on the greater curvature are removed in every case.

doubly tied and cut. Sometimes the right margin of the omentum becomes very much congested from the venous obstruction produced in this way. In a few cases it has seemed wise to excise the devitalized omentum, especially if drainage is to be used, with its attendant possibilities of secondary infection. In one such case a considerable amount of omental tissue sloughed, although fortunately the patient recovered. If drainage is not used, it will act as an omental graft and give no trouble. It is important that, in ligating the gastroduodenal vessel and the gastrocolic omentum, the fingers should raise the structures away from the middle colic artery which runs immediately beneath in the transverse mesocolon. (Fig. 3.)

The lesser cavity of the peritoneum is a potential rather than an actual space, as the two layers of peritoneum are in contact, and the middle colic has been accidentally caught in tying the vessels from without inward. As this vessel is usually the entire supply of the transverse colon, ligation may result in gangrene of the transverse colon, as pointed out by Kronlein. This has happened a number of times. The control of hæmorrhage is very similar to the ligation of the four vessels concerned in abdominal hysterectomy and fully as easy.

(C) The duodenum is doubly clamped and divided between with the actual cautery to prevent inoculation of the cut surfaces with cancer. (Fig. 2.) The duodenal stump should be left one-fourth inch long, and, before removing the clamp, a running suture of catgut is introduced through the seared stump and tied as the clamp is removed. A purse-string suture of silk or linen, three-quarters of an inch below the stump, enables inversion in a similar manner to the stump of the appendix. (Figs. 2 and 3.) A long Kocher holding clamp is now placed from the tied gastric artery at Mikulicz's point of election in an oblique direction, so as to save as much as possible of the greater curvature to Hartmann's point of election on the greater curvature. (Fig. 3.) The blades of this clamp should be covered with rubber tubing, and the compression should be just sufficient to retain the tissues in its grasp. A second clamp is applied on the tumor side to prevent leakage.

The tissues between are severed with the Paquelin cautery, one-quarter of an inch from the holding clamp, and as the tissues are divided, several catch forceps are caught on the projecting stump to prevent retraction of some part of the gastric wall from the grasp of the Kocher clamp. The pyloric end of the stomach, with the tumor guarded against leakage by the clamp at each end, is removed. The cauterized stump projecting beyond the Kocher clamp is rapidly sutured with a catgut button-hole suture, from the greater to the lesser curvature, through all the coats of the stomach, and in the same manner directly back, and tied at the starting-point; this prevents hæmorrhage as well as leakage. (Fig. 4.) The doubling of this form of suture holds the approximated edges evenly in line. The Kocher clamp is now removed and any bleeding point caught and tied.

The final suture is now introduced of silk or linen, and made after the right-angled plan of Cushing. It is taken sufficiently far from the catgut-suture line to enable easy approximation of the seromuscular layers without tension. (Fig. 5.)

Steps (b and c) can be varied sometimes to advantage. We have frequently tied off the gastrohepatic ligament and the superior vessels, and at once double clamped and divided the duodenum. By pulling upward on the stomach side the gastro-duodenal artery is easily caught, tied, and divided, and the operation proceeded with as before. In a few cases we have begun on the stomach side, ligating and dividing the gastric and left gastro-epiploic vessels first, then clamping, dividing, and suturing the stomach as before. Complete the duodenal end with its vessels last. This is favored by Hartmann. If there are adhesions, however, the first plan mobilizes the stomach much better, and enables more accurate work and greater exposure of that part of the stomach which at the line of section lies naturally deep under the costal arch.

(D) Restoration of the gastro-intestinal canal was first accomplished by Billroth, by joining directly the cut surface of the duodenum to the shortened stomach, the opening of the latter viscus being partly sutured to reduce it to the size of the
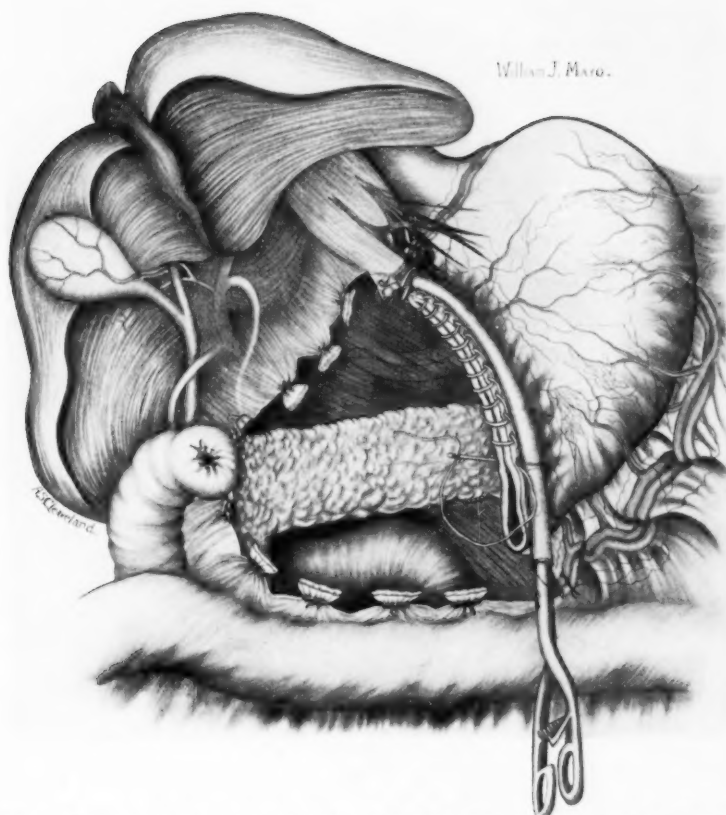
FIG. 4.—Showing closure of cut duodenal end by circular suture and first row of sutures being placed on the stomach side.
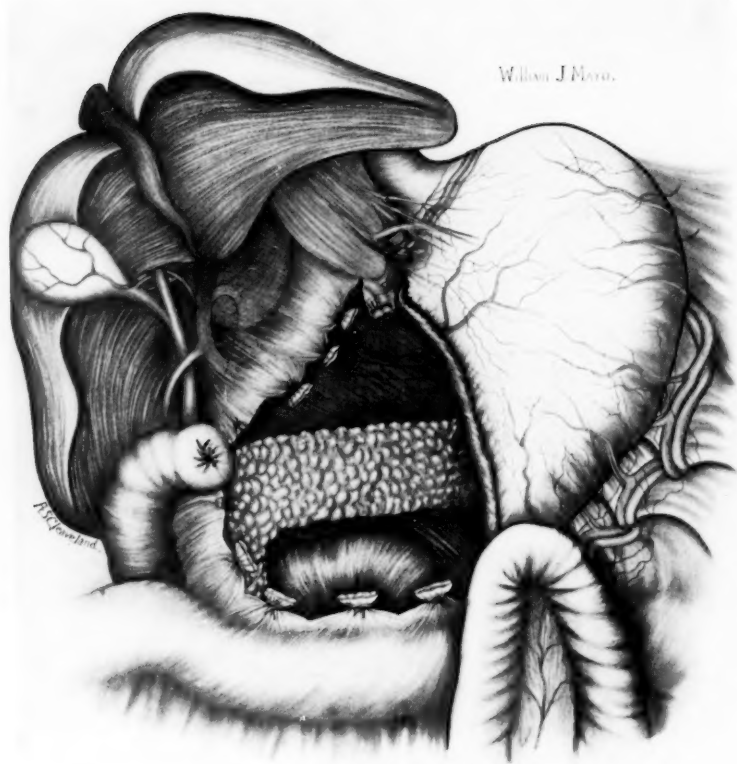
Fig. 5.—Showing completed operation

duodenal end. The angle where the three suture lines came together leaked so often, especially if there was the least tension, that it was called the " fatal suture angle." Kocher saw the defect in this method, and began implanting the cut end of the duodenum to the posterior gastric wall at a sound point, and completely closed the stomach. This method gives excellent results, if there be no tension, in bringing the parts into easy apposition. Unfortunately, this often happens.

Billroth's second operation is the operation of choice, complete closure of the duodenal and stomach ends with an independent gastrojejunostomy of the usual type. It has the two chief requisites of gastro-intestinal anastomosis; there is no tension, and the parts to be united have not been injured. Either the anterior or posterior method can be used and the Murphy button or suture operation be performed. If the patient is in good condition and the operation has been completed promptly, we prefer the posterior suture method; if the patient's condition is poor, the anterior button operation is chosen. (Fig. 5.)

(E) Infections. The question of cancer infection grafted upon a raw surface is an important one. We have seen carcinomatous nodes develop in the abdominal incision and in the abdominal needle punctures made in suturing the abdominal wall after partial gastrectomy. Dissemination of carcinoma by rough handling or allowing infected cells to escape into the wound is not uncommon. It is for this reason that all sections of the diseased part are made with the actual cautery, which prevents inoculation of raw surfaces and checks capillary hæmorrhage, and leaves the approximated ends in an aseptic condition until they are digested back to the outer suture line. Pyogenic infection is prevented by the clamps placed upon each side of the excised stomach, sealing against escape of contents, while the exposed edges beyond the clamp are sterilized by the use of the cautery in making the section. In addition to this the gauze pads are arranged in two rows,—an outer deep layer, which is not changed until final removal, and an inner superficial layer, which is being constantly renewed. Upon

removal of the final gauze pack the entire field is carefully
gone over and any little bleeding point checked by ligature.
After sponging the surfaces with a moist saline gauze pad, the
abdominal incision is closed.   In some cases drainage seems
wise on account of accidental soiling.   This is seldom neces-
sary, but if in doubt, drain, and best with a cigarette drain
placed at the lower angle of the external wound, entirely away
from the visceral suture lines.   The internal end of the drain
should reach to a situation just above the transverse colon,
which acts as a dam when the patient is placed in the proper
position in bed,—head and shoulders elevated.   In this half-
sitting posture, the little pouch formed by the transverse colon
is not unlike an artificial pelvis into which any fluids gravitate.
If there be but a limited area to be quarantined, the gauze
should be brought out in the most direct manner possible.

(F) Shock. If the patient is in good condition, there is
practically no shock, because there is no blood loss and little
exposure of abdominal contents.   The operation proceeds sys-
tematically, and can be done in a suitable case by the average
operator, from the beginning of the abdominal incision until it
is closed, in from fifty minutes to one hour and fifteen minutes.
If the patient's condition is very poor, owing to early obstruc-
tion, the chief danger comes from the lack of fluids in the body.
As suggested to us by Dudley Allen, this should be made up
by subcutaneous infusions of saline solution, forty to sixty
ounces a day, usually twenty to thirty ounces every twelve
hours, for two days previous to the operation.   This is con-
tinued for several days following operation, if necessary.   In
these dehydrated patients, it is almost impossible to get suffi-
cient fluids into them in any other manner.   For subcutaneous
infusions, we prefer the ordinary Davidson syringe, to which
is attached an aspirating needle.   The hand-bulb enables nice
regulation of the inflow.   The whole can be boiled, and the
infusion given by a nurse as easily as an enema.   In debili-
tated patients very little anæsthetic is used, just enough to
enable the surgeon to open and close the abdomen.   All of the

visceral work can be done without pain. The previous exhibition of morphine keeps the patient from becoming nervous.

An enema of six ounces of coffee is given as soon as the patient is put to bed. If necessary, morphine, strychnine, or like remedies are exhibited.

The after-treatment is simple,—the head and shoulders of the patient are raised by four or five pillows, rectal alimentation is instituted, hot water by mouth after twelve hours in tablespoonful doses, increased to an ounce every hour. After thirty-six hours the usual experimentation with liquid foods is begun.

To recapitulate, there are six important stages to the operation as outlined.

Step 1. Open the abdomen. Step 2. Double ligate and divide the gastric artery; ligate and divide the necessary amount of gastrohepatic omentum close to the liver, leaving most of its structure attached to the stomach. Double ligate and divide the superior pyloric artery and free the upper inch or more of the duodenum. (Fig. 2.) Step 3. With the fingers as a guide underneath the pylorus, in the lesser cavity of the peritoneum, ligate the right gastro-epiploic or gastro-duodenal artery, and progressively tie and cut away the gastro-colic omentum distal to the glands and vessels up to the appropriate point on the greater curvature, and here ligate the left gastro-epiploic vessels. (Fig. 3.) Step 4. Double clamp the duodenum, divide between with the cautery, leaving one-fourth inch projection. With a running suture of catgut through the seared stump the end of the duodenum is closed as the clamp is removed. A purse-string suture about the duodenum enables the stump to be inverted. (Figs. 2 and 3.) The proximal end of the stomach is double clamped along the Mikulicz-Hartmann line (Fig. 3) and divided with the cautery, leaving one-fourth inch projection. Suture through the seared stump with a catgut button-hole suture. This is again turned in after removal of the clamp by a continuous silk or Cushing suture. (Figs. 4 and 5.) Step 5. Independent gastrojejunostomy. (Fig. 5.) Step 6. Closure of the wound.

There have occurred in the hands of my brother, Dr. Charles H. Mayo, and myself forty-one radical operations upon the pyloric end of the stomach, thirty-seven for cancer, four for inveterate ulcer. Of these, thirteen have been made essentially by the plan outlined above, with one death. There were six deaths in the remaining twenty-eight cases, performed by various methods. In the last eleven cases this technique was used practically as given, and there were no deaths. Making all due allowance for increased experience and possibly better selection of cases, the difference is too marked to be entirely accidental. It is hardly necessary to say that this is a composite operation, and in no sense to be considered original.

In a previous contribution on this subject, published in the ANNALS OF SURGERY for July, 1903, a somewhat similar operation was recommended by the writer, only that it was far more extensive, removing all of the stomach excepting the dome. With increased observation and experience, the author feels the former operation, with a mortality of three deaths in eight cases, to be unnecessarily severe for the average case of pyloric cancer. The operation described at that time has a place in surgery, and should be used in the cases of more extensive disease involving the body of the stomach. In these cases it has practically all the advantages of complete removal of the stomach, and should be used as a substitute for total gastrectomy where possible. The operation herein described with a mortality of one in thirteen should be the operation of choice for the average case of fairly early disease of the pyloric region.

CONTRIBUTION TO THE SURGERY OF PERFORATING GASTRIC ULCER.

BY ARCHIBALD MacLAREN, M.D.,

OF ST. PAUL, MINNESOTA.

GASTRIC ulcer is comparatively a common disorder. Although medical treatment has been followed by an apparent cure in a majority of cases, in many instances even the rest and starvation cures have been insufficient, and many of the cured cases have relapsed, to become chronic invalids if they were not relieved by surgical measures.

Dr. William J. Mayo has done more than any one else in this country to impress upon us the frequency of gastric ulcer and the necessity of performing some operation to overcome the deformities of the stomach which follow, or to cure the ulcer itself.

Perforation results from the extension of either an acute or a chronic ulcer, and has been looked upon as a very rare occurrence. Extra-uterine gestation was supposed to be a surgical curiosity, but when Tait, with his lucid description, opened our eyes, we commenced to see them with great regularity. My own belief is that perforating gastric ulcer is fully as common as an extra-uterine gestation, and that when our eyes are opened to this fact, we will be able to see them, diagnose them early, and save many lives that are now lost.

The English journals of the past two years contain many records of perforating gastric ulcer. It would seem as though, through the influence of Mr. Mayo Robson, the English physician is better able to diagnose these cases than his American brother. In this country, I do not believe that perforation cases reach the hospitals as often as they do abroad.

For instance, such cases as the ones described by Crisp and Fenwick, where a young girl, who had never given any marked gastric symptoms, suddenly screams, falls to the floor, soon be-

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comes unconscious, and dies in a few hours. In two such cases perforative gastric ulcer was found as the cause of death at the post-mortem. No wonder such cases have never been understood. In proof of my conclusions that these cases do not reach the hospitals, Mayo reports 313 operations on the stomach and the first portion of the duodenum with only five perforations. Greenough and Joslin, in their study of 187 consecutive cases of gastric ulcer, seen at the Massachusetts General Hospital between the years 1888 to 1898, stated there were only six perforations, all of which died.

On the other side, Mr. Mansell Moullin reports that between the years 1897 and May, 1902, there were admitted to the London hospital 500 gastric ulcers, of this number forty-eight, or 10 per cent., died from peritonitis and perforation.

Lebert found acute general peritonitis with perforation in 12 per cent. of his own cases, and in 37 per cent. of the fatal cases which he was able to collect from the literature. Dr. Samuel Fenwick, consulting physician to the London Hospital, found that in 678 autopsies with open gastric ulcer up to 1900, perforation had occurred in 153 cases, or 23 per cent. Mr. Moynihan, in the London *Lancet* of January, 1903, reports fifty-one perforating duodenal ulcers, most of them from the literature, and many of them in which a mistaken diagnosis of appendicitis had been made.

Moynihan's division of peptic ulcers seems particularly good. He divides perforative ulcers of the stomach and duodenum into acute, subacute, and chronic. In the acute form the opening is large, and considerable amount of stomach contents is suddenly emptied into the peritoneal cavity. In the subacute the stomach is empty or the opening is small, and consequently the peritoneum is slightly soiled. In the chronic form the opening is walled off by adhesions.

All authorities agree that, whereas gastric ulcers are more common on the posterior wall, acute perforations are usually on the anterior surface. The posterior ulcers are more frequently chronic in their method of perforation, leading to the formation of subphrenic abscess.

The premonitory symptoms of perforating ulcer are usually well marked. There are the ordinary symptoms of gastric ulcer, local tenderness, and pain after eating, in a spot just below and a little to the left of the ensiform cartilage, or in a corresponding point in the back; belching of gas, sometimes hæmatemesis or melæna; some or all of these symptoms existing for a few days or for several months.

In a certain considerable proportion of cases, however, all premonitory symptoms are lacking, and this is often true in the most acute perforations with either acute or chronic ulcers, especially if the ulcer is well up on the anterior surface near the lesser curvature, the so-called latent gastric ulcer of Robson.

The immediate symptoms of acute perforation are, first, sudden, agonizing, overwhelming pain in the region of the stomach, something tearing in character, often with the sensation of something having given away. This pain is frequently so intolerable that the patient falls to the ground, and even may become unconscious, as in the cases described above. The pain rapidly spreads, following the gastric contents to other parts of the peritoneal cavity. If the perforation be near the pylorus or in the duodenum, the stomach contents flow over the hillock of the right transverse mesocolon into the right kidney pouch, and from there into the right iliac fossa, which accounts for the fact that many of these cases are diagnosed as appendicitis. Rigidity and tenderness of the abdomen soon follow, together with profound collapse. The absence of liver-dulness is a symptom upon which some authors place considerable reliance; but if the stomach does not contain considerable gas at the time of the perforation, the liver-dulness will not be changed.

My experience leads me to believe that Dr. Richard Harte, of Philadelphia, is correct when he says that rigidity or tension of the abdominal muscles is the key-note to the early recognition of peritoneal perforation from whatever source. The pain may subside, the temperature may not be elevated, but the rigidity continues even up to the end.

Vomiting is seldom present with perforation, wherein these cases differ from acute peritonitis from other causes; the prostration and collapse are well marked, the pulse is weak at first, and frequently becomes dichrotic and small, and the other symptoms are the well-known evidences of a very acute general peritonitis.

The symptoms of subacute or chronic perforations are naturally not so well marked. But in the main they are the same as in acute cases, only milder and slower to develop. Often they will simply be the symptoms of a local peritonitis or of an intraperitoneal abscess located near the stomach.

In making a diagnosis of perforating ulcer, we should, first, carefully distinguish between commencing inflammations above the diaphragm and any disorder below. We must remember that occasionally an acute pleurisy or pneumonia may in some degree resemble a perforation in the upper abdomen.

As between the different intraperitoneal inflammations or accidents which may be mistaken for perforation, the differential diagnosis is not so important, and is perhaps frequently impossible. Lund and Fitz, of Boston, believe that the differential diagnosis is not possible between this condition and an acute pancreatitis or perforation of the biliary passages.

Mr. C. B. Keetley says that certainty of diagnosis in most cases of gastric perforation is impossible even with experienced persons, but that " it is not necessary;" and he further says any physician who, in the face of such symptoms as these which I have already described, wastes valuable time in the attempt to make an accurate diagnosis is almost criminally responsible for the death which is sure to follow. For example, Mr. Bidwell recently collected fifty-five cases of perforating ulcer; in this list most of the cases operated upon in the first twenty-four hours recovered; after that time the great majority of the cases died.

Personally, I believe that many of these cases can be correctly diagnosed, as is proven by a few cases which I here report, and the many cases which are constantly being published in the journals. If we will only rid our minds of the old idea

that these cases are rare, and will appreciate that they are not uncommon, we will not miss them so frequently.

What is the duty of the medical man when he meets such a case? My answer would be to first give the patient morphine; that will be necessary on account of the terrible pain which these patients suffer during the first few hours, and then without delay have him transported to the nearest hospital, lying in a wagon or on a cot in the baggage-car, or in an ambulance if one is to be had. This should be done because these patients have a much better chance of recovery in a hospital, despite the transportation, than they would if operated upon in a private house.

The secret of success in treatment of acute perforations is an operation at the earliest possible moment, followed by suture of the opening with silk or linen or caulking the opening with gauze. Sponging if the peritoneum is slightly soiled, without drainage; but if a considerable amount of fluid is found in the peritoneal cavity, a large-sized drain should be put into the pelvis through a stab wound over the symphysis, and the patient be put to bed in the Fowler position.

CASE I.—*Perforating Latent Gastric Ulcer on the Anterior Wall; Operation Eleven Hours after Perforation; Recovery.*

F. M., aged thirty years. Six years ago he had what was supposed to be tuberculosis, followed by some slight hæmorrhages and faint spells, referred to the stomach, which were relieved by eating something or taking a teaspoonful of whiskey. These symptoms lasted for about one year, when he entirely recovered. For the past four days he had suffered from some slight gastric distress, and was dieting himself. He was working on his farm in Southern Minnesota at 10 A.M., June 3, when he was suddenly seized with such severe pain over the stomach that he fell to the ground. One hour later he was seen by Dr. Frazer, of Lyle, who made a diagnosis of " some serious intraperitoneal accident." He immediately put this young man on a cot and got him on to a train which was just leaving for St. Paul. I first saw him at 8.30 P.M., and made a guarded diagnosis of perforative ulcer of the stomach, on account of the history and the large quantity of

fluid which had evidently been passed into the peritoneal cavity.
Still, as the pain was most intense in the pelvis when I saw him,
I made an exploratory opening over the appendix for drainage.
When I found that the appendix was normal and that the abdomi-
nal cavity was filled with a thin, turbid, watery fluid, I immedi-
ately made a stab wound over the symphysis and put in a large-
sized aluminum tube, also tube and gauze in the McBurney's
X-muscle incision.   I then made an opening over the stomach
and found without any difficulty a perforation on the anterior wall
nearer the lesser curvature and two inches from the pylorus, the
opening being about the size of a pea with slightly thickened
edges.   The opening was easily and quickly closed with a silk
purse-string suture.   One end of a small gauze strip was folded
down over the opening and was caught with a catgut stitch.

The patient was put to bed in the Fowler position, sitting
almost completely upright, tied to a bed-rest. He kept this posi-
tion from choice for several days, finding that he was more
comfortable while sitting upright than when he was lying down.
All the drains were removed on the fourth day and he made a
prompt and rapid recovery.   He reached home in less than a
month, and has remained perfectly well, attending to his business
as a farmer and banker for the past six months.

Dr. Frazer writes me that our patient is in the best of health,
can eat anything, but that he has the worst breath that he has
ever come in contact with.

CASE II.—*Probable Perforating Gastric Ulcer; Death in
Twenty-Nine Hours without Operation or Post-Mortem.*

While Case I was still in the hospital, Dr. Cameron, the
house surgeon, went to Rush City for a few days to help Dr.
Stowe of that place. Together they saw Miss M., who had been
a constant sufferer from anæmia, with attacks of indigestion off
and on for a year and a half. This young woman was out work-
ing in the garden, when at 11 A.M. she was suddenly seized with
the most acute and agonizing pain over the stomach, and became
collapsed.

Dr. Stowe saw her two hours after the accident and gave her
morphine for her pain, but was not able to make a diagnosis, but
suspected ruptured extra-uterine gestation. The next morning
Dr. Stowe and Dr. Cameron saw this woman together; she had
a rapid, weak pulse, and was suffering great pain and dyspnœa.

Her abdomen was hard and rigid, especially in the upper portion, while the lower abdomen evidently contained fluid in considerable quantity.

I was called to see her, but did not reach Rush City until just as she died at 4 P.M.. It was not possible to get a post-mortem examination in this case, so the absolute diagnosis is impossible. Her history is very suggestive to me.

CASE III.—*Subacute Perforating Gastric Ulcer; Operation Nine Hours after Perforation; Recovery.*

E. H., a young man twenty-seven years of age; had never suffered from any severe illness, but for the past two years he had some indefinite stomach distress. For the past ten days he had suffered from a more pronounced pain in the stomach, but not enough to cause him to consult a physician or to stop work. His pain was fairly constant, being relieved for a couple of hours after eating. His appetite was poor, and he was afraid to eat much but liquids.

At 11.30 A.M., on September 2, 1903, he was working at a bench; he suddenly had the most intense pain over his stomach and dropped to the floor. My partner, Dr. H. P. Ritchie, who had assisted me with Case I, was called to see him. He made the absolute diagnosis. Dr. Rothrock, of St. Paul, was their regular physician, so he was called upon to operate upon this case. He found a chronic ulcer on the anterior wall of the stomach one inch from the pylorus, in the cavity of which was a minute perforation about the size of a pin's head exuding mucus and gas. The opening was closed, the peritoneum sponged, and closed with a cigarette drain; the patient promptly recovered.

Here are two proven cases occurring in the practice of Dr. Ritchie and myself in three months, with one probable case during the same length of time, which makes me feel that perforative gastric ulcer is not a very uncommon disease; and that probably other cases of acute peritonitis which I have seen in the past were due to this same cause. My previous experience with perforating gastric ulcer is confined to two cases; one operated upon ten years ago, for what was supposed to be a perforative appendicitis, on the third day. A large abscess in the pelvis was opened and drained. The man lived thirty-

six hours. The post-mortem examination revealed an opening as large as a silver quarter, well up on the anterior surface of the stomach, with thickened edges. The second case, June, 1901, immediately followed a supravaginal amputation of the uterus for an old suppurative disease of both appendages. In this case I had introduced the gloved hand and explored the upper abdominal cavity without being able to make out any diseased condition. The operation was immediately followed by an acute peritonitis, which was supposed to be due to the hysterectomy. At the post-mortem we found a chronic ulcer low down on the posterior wall of the stomach with an opening which would just admit the tip of the little finger.

CIRRHOSIS OF THE STOMACH.

BY JOHN G. SHELDON, M.D.,

OF TELLURIDE, COLORADO,

Surgeon in Charge of the Miners' Union Hospital.

Mr. H. C., fifty-two years of age, came to me, December 1, 1902, complaining of severe pain in the abdomen, vomiting, and inability to eat or drink. His previous symptoms were as follows:

He was perfectly well until he reached his thirty-eighth year, fifteen years ago. From this time his symptoms can be divided, for description, into four periods. From the thirty-eighth to the forty-fifth years of his life he was troubled, at intervals, with " sourness of the stomach, occasional vomiting,—sometimes in the morning and ofttimes after meals; poor appetite part of the time, dull pain in the abdomen, belching of gas at intervals, and a coated tongue most of the time." These symptoms had slowly progressed in severity. Their inception was so gradual that the patient was unable to determine definitely the time that he first noticed them, but they gradually annoyed him more and more, so that when he was forty-five years of age he felt well only at short intervals.

During the next four years, from his forty-fifth to forty-ninth years, his symptoms were gradually becoming more severe, but he had continued to work on his farm. During these eleven years of suffering he had received no treatment, neither had he taken medicine of any kind.

During the last three years of his illness, he was unable to work on account of weakness and suffering. The pain in his abdomen was nearly always present. Usually it was a " dull, gnawing pain in the pit of his stomach," but sometimes he would have severe paroxysms of pain that would require morphine to relieve them. The pain was always in the median line of the abdomen above the umbilicus. It never seemed to be located in a small area, and never radiated. Ingestion of solids or liquids increased the severity of the pain. Vomiting sometimes, but not always, gave him partial but not complete relief. So far as he

knew, pressure on the abdomen did not diminish or increase his suffering.

Next to pain, vomiting was his most distressing symptom. He always vomited after eating solids, and frequently he was unable to retain liquids. Sometimes he would vomit immediately after eating; again, two or three hours would elapse before emesis occurred. He had frequently noticed that he would vomit food that he had eaten forty-eight hours previously. This puzzled him very much. He was at a loss to explain how he could vomit several times, and then, after ten or twelve hours had elapsed, succeed in bringing up material that had remained in his stomach during four or five previous attempts at vomiting. At no time had he ever vomited blood.

The symptoms that he complained of, other than pain and vomiting, were as follows:

His appetite was always good till the last year of his illness. During this time he was never hungry, and when he forced himself to eat, his food seemed without taste. At times he would crave certain articles of food. On one occasion he sent twenty miles for fresh onions, and when they came a taste of them was all he could eat.

His general condition remained fairly good, although he was progressively losing in weight and strength. His bowels were usually constipated but responded to cathartics. Copious evacuation of the bowels did not relieve the pain or vomiting. The treatment that the patient received during the last three years of his illness was as follows:

The first year was taken up with experiences with the local profession. The diagnosis was invariably chronic gastritis; and the internal administration of sodium bicarbonate and elixir of iron, quinine, and strychnine phosphates fairly represents the treatment. After trying these methods for one year, he went to one of the larger Western cities and consulted a " specialist." He remained in the city one month, having gastric lavage performed daily. After returning home he remained on a liquid diet for three months. During this time he felt better, but gradually the liquids gave him much distress and he could no longer retain them. He gave various patent remedies a trial for a few months, and then went to one of the larger Eastern cities for treatment. Here a diagnosis of gastric ulcer was made and

rectal feeding resorted to for three weeks. During this time he improved. He had very little pain, did not vomit, and seemed to gain in strength. He returned home believing that he would now get well. As soon as he began to eat, the old symptoms immediately returned. By this time the patient was very weak and considerably emaciated. He again applied to the local physicians for treatment, and it was through them that I saw him in consultation. At this time he vomited everything that he took into his stomach with the exception of small quantities of hot water.

Examination.—The patient was a well-developed but extremely wasted and anæmic man of fifty-two years. His skin was dry and somewhat darkened, but he was not jaundiced. Examination of the thoracic contents revealed nothing abnormal. The lungs showed only evidences of a chronic bronchitis. The heart was not enlarged or displaced. A systolic murmur was heard over the pulmonic area. The peripheral arteries were somewhat sclerosed. Otherwise, the circulatory system was normal. The abdomen was not distended or rigid. The epigastrium was tender on deep pressure. No masses or points of tenderness were found. Examination of the liver was negative. The spleen could not be palpated. Rectal examination revealed nothing abnormal. Examination of the lymphatic and nervous systems was negative. Gastric lavage was performed after giving a test meal. The result of the examination was as follows:

Acid reaction.

No hydrochloric acid found.

Organic acids present.

No Boas-Oppler bacilli found.

It was found that only a very small quantity of water could be passed into the stomach. When more than six or eight ounces were used, the patient would retch violently and expel it. Inflation of the stomach with carbon dioxide was quite puzzling to me. I had expected to find the organ dilated. But when the stomach was filled with gas its outline could not be determined by external examination.

Examination of the urine was negative. The blood examination was as follows:

Red cells, 2,800,000.

Leucocytes, 5800.

Hæmoglobin, 48 per cent.

Stained specimens showed a few nucleated reds, but no fragmentation of the cells was seen.   The eosinophiles were not abnormally increased in number.   The proportion of the polynuclear to the mononuclear leucocytes was normal.

A positive diagnosis was not made at this time.   A stenosis of the pylorus seemed probable, but the absence of a dilated stomach made me cautious in making this diagnosis.   Malignant disease was seriously considered.   The examination of the stomach contents did not contradict this diagnosis, and a physical examination would not exclude diffuse carcinoma of the organ. The family history regarding malignant disease was negative. Rectal feeding was advised for a period of three weeks as a diagnostic aid and as preparatory treatment for operation.   During this time the stomach was frequently washed out and its contents examined.   The only variation noted by the examinations was the gradual diminution in the quantity of organic acids. When the patient took nothing by mouth, he was practically free from pain and did not vomit.   He retained the nutrient enemas well, and gained strength while being nourished in this manner.

A probable diagnosis of benign stenosis of the pylorus was made and operation advised.   On the 3d of January, 1903, the patient was given two ounces of castor oil.   He retained this, and in a few hours had several evacuations of the bowels.   The stomach was washed thoroughly with sterile water on the night of January 4, and the process repeated the next morning, at which time the operation was performed.   Ether was used as an anæsthetic, preceded by one-quarter of a grain of morphine and one one-hundred-and-fiftieth of a grain of atropine given hypodermically.   A median incision was made in the epigastrium.   The stomach was not deformed, but was very small.   It did not measure more than two inches in its greatest transverse diameter, nor more than six at its longest part.   The external surface was smooth and no adhesions were present.   The stomach appeared perfectly normal on its outer surfaces, but was extremely diminished in size.   It felt firm, elastic, and resistant.   It seemed to be of a uniform consistency, with the exception that the pylorus, and the portion of the stomach next to it, was more firm than the remainder of the organ.   No enlargement was felt in the region of the pancreas.   The gall-bladder was not distended, and no

solid masses could be detected by palpating it. The liver seemed normal. The appendix was brought into the wound, but showed no abnormal changes. The spleen was not examined. A gastro-enterostomy was done with a Murphy button. A transverse opening was made in the small intestine about sixteen inches from the point where the duodenum passes under the superior mesenteric artery. The opening in the stomach was made on the anterior surface, parallel to the smaller arteries of the stomach (that is, at right angles to the greater curvature) and in the very lowest part of the organ. The stomach wall was at least one centimetre in thickness. It cut with resistance, and the cut surface looked like fibrous tissue. So far as could be determined, the gastric mucosa was smooth and atrophic. The size of the pyloric opening could not be determined, but it must have been very small. The omentum was sutured to the stomach, over the anastomosis, with catgut. The abdominal wound was closed in layers with catgut and silkworm gut.

The operation was attended with little shock. The patient was propped up in bed as soon as he had recovered from the anæsthetic. Nothing was given by mouth for three days, then small sips of hot water were given at frequent intervals. After the twelfth day liquid food was given by mouth and borne by the patient without discomfort. The button was passed on the thirteenth day. On the eighteenth day the patient was allowed to eat solid foods. Since that time he has eaten everything and anything that he desired, and has experienced no trouble with his stomach in any way. He has never vomited since the operation was performed; neither has he suffered from pains or gaseous eructations as he formerly did. Three months after the operation was performed, he had gained thirty-six pounds in weight and felt well and strong. The patient tells me to-day (November 18, 1903) that he has worked on his farm all summer; that he has suffered none with his stomach; that he eats well and relishes his food, and that he weighs as much as he did when he was thirty years old.

From the history of this case, both before and since the operation was performed, I have come to the conclusion that this was a case of benign sclerosis of the stomach, and that the patient is free from malignant disease.

It has been a much discussed question whether a non-
malignant cirrhosis of the stomach exists.   I think that the
preponderance of the evidence demonstrates to us clearly that
while it may be at times difficult, or even impossible, to dis-
tinguish between a diffuse carcinoma of the stomach and a
cirrhosis ventriculi, still, in rare instances, a benign cirrhosis
of the stomach does occur.   Andral,[4] Cruveilhier,[5] Brinton,[6]
Habershon,[7] Wilks,[8] and most of the earlier writers, have
clearly drawn the distinction.   The evidences on which their
opinions are based, it must be admitted, were imperfect.   How-
ever, the opinions of so many close clinical observers are not
without their weight in this matter.   Most of the recent writers
give the condition recognition, but their statements are brief
and in no way convincing.   Einhorn [1] makes the positive state-
ment that a benign cirrhosis of the stomach does occur.   Osler[2]
recognizes the condition and reports one characteristic case.
Hemmeter[3] states that the pylorus may be the seat of a hyper-
trophic stenosis, and that in rare instances the entire stomach
may be involved in the hypertrophic process.   Leith [4a] recog-
nizes the condition and discusses it at some length.   He has
observed one case, and mentions a case seen by Dr. Clifford
Allbutt.

Most German writers contend that a diffuse benign cir-
rhosis of the stomach does not occur.   They maintain that all
of these cases are carcinomatous.   Bret and Paviot [9] share the
same opinion with the Germans.   They state that their opin-
ion is based on the condition of the perigastric glands in their
cases.   They admit that no evidence of carcinoma was found
in the stomach walls themselves, but in the same case the lym-
phatic glands gave evidences of cancerous involvement.   I am
unable to find a detailed report of their cases, neither do I
know the number of cases they have reported.

G. B. Hunt reports a case of diffuse carcinoma of the
stomach, and is of the opinion that cases of diffuse thickening
and contraction of the organ are malignant.   He does not
refer to any proof for his belief with the exception of the re-
port of one case.

I am of the opinion, from observing the case herewith reported and from examining the reports of others, that a benign diffuse cirrhosis of the stomach, though a rare condition, does occur. Of course, it is possible that a carcinomatous process may develop in a stomach already the seat of chronic cirrhotic changes; but, as will be seen from the pathology of the conditions, that will be discussed later, it is improbable that such a case has been recorded. Before discussing the condition in general, I shall give the reports of the cases that have been recorded.

CASE I.—*A Case of Extreme Contraction of the Stomach.* (W. B. Hadden, *Transactions of the Pathological Society,* 107, London, 1891.)

A woman, thirty years of age, suffered from epigastric pain and vomiting for ten months. During the last three months of her illness she was obliged to nourish herself with liquid food only, which she took very slowly. She was very weak and greatly emaciated. During the last month of her life she refused to take food of any kind, and during this period she vomited very little.

Post-mortem.—The stomach was tube-like in shape and was only four and one-half inches long. It is stated that its circumference measured only one inch. The stomach walls were one-half inch in thickness. The first two inches of the organ, joining the œsophagus, were roughened and ulcerated. The remainder of the lining of the stomach was smooth, white, and firm. Microscopical examination showed that the mucosa had disappeared. There was found great fibrous thickening of the submucosa. It is described as presenting an "open-textured" appearance that suggested œdema. The muscular and serous coats were described as being normal. No signs of malignancy were found, and no etiology for the condition could be determined.

CASE II.—*Fibrous Contraction with Hour-glass Stricture of the Stomach.* (F. C. Turner, *Transactions of the Pathological Society,* London, 1887.)

A man, sixty years old, suffered from dyspepsia for one month. Then vomiting occurred; he became greatly emaciated, and died at the end of three months.

Post-morten.—A tight stricture was found two inches from the pylorus, which did not admit a glass rod about one-eighth of an inch in diameter. The stomach was much contracted and its walls greatly thickened and fibrous, especially along the lesser curvature. The mucosa showed many superficial ulcerations along the lesser curvature from the point of stricture extending towards the cardia. On the anterior wall of the stomach, a short distance from the stricture, there was a chronic ulcer the size of a shilling. The mucosa was seamed with interlacing fibrous tracts. The peritoneal covering of the stomach was roughened

by many loose, fibrous adhesions. No other abnormal lesions were found in the abdomen. The author says that while contractions of the stomach resembling this one often result from ulcerations, that so extended a lesion as the one he reports cannot be due to the results of gastric ulcers. He thinks that the interlacing fibrous tracts in the mucosa were probably due to fibroid degeneration of an irritative growth of the connective tissue of the submucous layer, and that this was associated with a general thickening of the gastric walls. He believes that the superficial ulcerations were secondary. He makes no mention of malignancy being present.

CASE III.—*Etude sur la Gastrite Chronique avec sclerose sous-mis-quense hypertrophique et retroperitonite calleuse.* (Victor Hanot and Albert Gambault, *Archive de Physiologie,* 1882.)

A woman, forty-four years old, and an alcoholic, entered Guy's Hospital complaining of abdominal pain and tympanites. Examination showed some ascites. Three weeks later the patient developed a general peritonitis and died.

Post-mortem.—The peritoneum was thickened, the liver was enlarged, and a considerable quantity of free fluid was found in the peritoneal cavity. The stomach was small, hard, and thick, and was described as being like a rubber ball. On section of the stomach it was observed that its walls were very thick. It is stated that they measured one inch in thickness near the pylorus. The microscope showed that the thickening was due to hypertropic changes in the muscular and submucous coats. These layers were found to be of equal thickness. The submucosa was very resisting, and had a dull, white appearance. Malignant disease was not considered by the reporters of this case.

CASE IV.—A woman, thirty-three years old, had complained of dyspepsia for four or five years. She had been a worker in straw-hat factories, and had the habit of pressing the handle of the iron with her abdominal wall. Her greatest complaint was vomiting. This gradually became more severe, but at intervals of several months she would not vomit at all. During the last two years, however, she vomited several times every day. She complained of severe pain in the epigastrium at times. Examination showed the presence of an egg-sized tumor in the region of the stomach. This was freely movable. The patient died from weakness and lack of nutrition.

Post-mortem.—The stomach was small and would hold only four or five ounces. Its walls were from three-quarters to one and one-half inches in thickness. The tissue of the stomach was moderately firm in consistency and showed no trace of a neoplasm. The mucosa was smooth and atrophic and showed no ulcerations. The tumor mass, felt before death, was situated in the submucous tissue, and microscopically was found to consist of imperfect fibrous tissue and some granulation tissue. There was absolutely no evidences of carcinomatous development. The remainder of the submucosa of the stomach showed a great increase of the fibrous elements, but no signs of carcinoma were found.

CASE V.—A man, forty-five years old, showed marked cachexia when first seen. His abdomen was distended and some ascites present. He

said that he had been sick one year, complaining of cough, bleeding from the lungs, pains in the stomach, and loss of appetite. He gave no history of having vomited.

Post-mortem.—The stomach was diminished in size and was adherent along its lesser curvature. The gastric wall was thickened, being from one to two centimetres in thickness near the pylorus. The stomach tissue was indurated and firm. The mucosa was smooth, pale, and indurated. Microscopically, there was found hypertrophy of the muscularis and great fibrous increase of the submucosa. The mucosa was atrophic and showed considerable loss of glandular structures.

Case VI.—*Progressive Contraction of the Stomach with Gastric Hypertrophy.* (Dr. Jacobi, *New York Medical Record,* Vol. xvii, 1880.)

A man, sixty-two years of age, formerly addicted to gluttony, said that he had been vomiting continuously for six months. He remarked that he rejected ingesta, in an unaltered condition, fifteen minutes after eating. He was markedly emaciated.

Post-mortem.—The stomach was small and was shrunken to the size of a loop of large intestine. Its walls were much thickened, but in places showed areas of marked attenuation. Many small cicatricial areas were found in the mucosa near the cardia.

(No report is given of further examination in this case.)

Case VII.—*Caso di notevale cirosi dello stomaes in soggetto non bevitare.* (A marked case of gastric cirrhosis in a non-drinking subject.)

Bolletinis d. sezione d. cultori d. scienze mediche n. r. Accedemia d. fisiocriciti di siena, Vol. v, 1887. Reported by C. Bernabei.

A man, sixty-three years of age, experienced great difficulty in swallowing solids. He vomited frequently, experienced great pain in the abdomen at times, and suffered from constipation. He became greatly emaciated, and died one year after the beginning of his illness.

Post-mortem.—The stomach was greatly reduced in size. It would hold about 100 centimetres. The greater curvature measured about twenty-five centimetres, the lesser curvature seven centimetres. The distance from the greater to the lesser curvature was seven centimetres. The anteroposterior diameter of the stomach was seven centimetres. The circumference of the pyloric orifice was seven centimetres; that of the cardiac five centimetres. Nothing is said concerning the microscopic findings in this case.

Case VIII.—Osler (" Practice of Medicine," page 467) mentions a case of cirrhosis of the stomach studied by himself and Henry. I understand that the report of this case was published in Montreal some years ago, but I am unable to obtain it. Osler makes the following statements: " The greater portion of the lining membrane of the stomach was converted into a perfectly smooth, cuticular structure, showing no trace whatever of glandular elements, with enormous hypertrophy of the muscularis mucosæ, and here and there formation of cysts."

Case IX.—R. F. C. Leith [a] mentions a case of cirrhosis of the stomach in which the involvement was diffuse and carcinoma improbable.

Microscopic examination showed beyond all doubt that the condition was not malignant.

CASE X.—Leith mentions a case observed by Clifford Allbutt [10] that was non-malignant. In this case, Allbutt believed that the cicatrical process had its starting-point in the healing of gastric ulcers. The stomach was much contracted, but was diffusely involved. The patient ultimately died of pyloric stenosis.

PATHOLOGY.—*The Size and Shape of the Stomach.*—In all of the cases the stomach was much diminished in size. In one case, that reported by Bernabei, [16] its capacity was estimated at 100 cubic centimetres. In all of the cases but one the stomach had retained its normal shape.

Thickness of the Stomach.—The walls of the stomach were uniformly thickened. In only one case was the thickening irregular. In the case reported by Jacobi, [15] many small areas were present in which the stomach showed marked thinning. In all of the cases, the thickness and induration of the organ was most marked in the region of the pylorus. The organ showed less evidence of involvement in the cardiac region. In all of the cases the entire organ was involved.

Peritoneum.—The covering of the stomach appeared normal in all but two cases. In two cases, reported by Hanot and Gambault, [14] the peritoneum was thickened; and adhesions, and evidences of a chronic inflammation, were present.

Muscular Coats.—The muscularis of the stomach showed abnormal changes only in one case. Hypertrophy of the muscle was present to quite an extreme degree in one case reported by Hanot and Gambault (Case III).

Submucosa.—In all of the cases the submucosa was markedly thickened, indurated, and showed marked increase in the fibrous elements. The muscularis mucosa was in every instance thickened and fibrous.

Mucosa.—In all of the cases the lining of the stomach was smooth, white, firm, atrophic, and indurated. The glandular elements were much altered, and in most instances had nearly disappeared. In one case reported by Turner [13] the mucosa was not entirely smooth, but was seamed in places.

Relation to Ulceration.—Allbutt states that he is of the opinion that the cicatrical changes observed in his case were the results of gastric ulceration. He does not discuss the subject in detail, neither does he attempt to explain the process. In the case reported by Turner,[13] a single ulceration was found the size of a shilling. Turner believes that this ulceration was secondary and had nothing to do with the primary cicatricial process.

Relation to Cancer.—From studying these cases, one would believe that cirrhosis of the stomach was not associated with cancer in any way. Many writers do not concede this. The position taken by Bret and Paviot[9] has been stated. They are of the opinion that these cases are all malignant, but they give no positive proof for their statements. Mathieu[19] believes that there is a close relation between cicatricial changes of the stomach and carcinoma. He says that " Interstitial gastritis with atrophy is commonly associated with carcinoma. Interstitial gastritis and cancer go side by side or follow one another, just as in certain cases of primary cancer of the liver nodular carcinoma and cirrhosis develop simultaneously or successively." Mathieu's statements may be perfectly correct, but he brings no evidence that in certain cases cirrhosis of the stomach may be unassociated with malignant disease. In my mind, there are cases of cirrhosis of the stomach in which the condition is sufficiently severe to terminate the life of the patient, and no carcinomatous involvement be present.

ETIOLOGY.—*The Nature of the Condition.*—I believe that the ten cases herewith reported are sufficient evidence to warrant us in considering cirrhosis of the stomach as an independent condition not associated with carcinoma. This statement will doubtless be objected to by some. I have no doubt that carcinomatous tissue might be present in some of the specimens that correspond, clinically and anatomically, to cirrhosis of the stomach. Such a case has been reported by Hunt.[11] On the other hand, it is just as possible that similar cases to the one reported by Hunt were not malignant at all. The presence of

glandular elements beneath the muscularis mucosa does not in
itself mean carcinoma of the stomach. A quotation from
Leuk[17] is of interest in this connection: " For an absolutely
certain diagnosis of carcinoma from small pieces of stomach
mucous membrane, we must prove an atypical epithelial pro-
liferation from the mucosa into the submucosa. Glands in the
submucosa even without mitotic figures must not necessarily be
the result of carcinomatous proliferation. Accessory Brunner
glands in the pylorus, or simply ends of glands that have been
cut off by a branch of the hypertrophic muscularis mucosæ, as
I have often seen it in complete sections, might simulate a
carcinoma."

Age.—The cases occurred in patients who were from
thirty to sixty-three years of age. The average age was about
fifty. Men and women were about equally affected. The
women, as a rule, suffered from the conditions at an earlier
age than did the men. We know little, if anything, concern-
ing the etiology of this condition. Brinton[6] supposed that
alcohol was the most prominent factor in the production of
cirrhosis of the stomach. The reports of the cases are not in
accordance with Brinton's belief. Only one patient (one
described by Hanot and Gambault[14]) was an alcoholic. Con-
genital predisposition might be considered of importance in
producing the condition. The pathologic changes found in
cases of congenital stenosis of the pylorus are similar to those
observed in the cases herewith reported. The report of a case
of congenital hour-glass stomach in a fœtus, by Sandifort,[20] is
of interest in this connection.

From the reports of the cases, it is probable that cirrhosis
of the stomach, when it does occur, is in the great majority of
instances unassociated with other diseased conditions. Cica-
tricial changes in the liver, spleen, or kidneys were not men-
tioned in any case. In only two cases was the abdominal
peritoneum diseased. In one case, reported by Hanot and
Gambault, ascites was present, but the peritoneum showed no
evidences of an inflammation. In another case the patient was

supposed to have died from an acute general peritonitis, possibly a terminal infection.

SYMPTOMS.—*Onset.*—In most cases definite symptoms were preceded by a long-standing dyspepsia. In no case was there present the history of a preceding disease involving the stomach. Symptoms that could be referred to the presence of a gastric ulcer were not complained of by the patient.

Vomiting.—The most distressing symptom was vomiting. It was present in all of the cases but one. It occurred in paroxysms at the beginning of the disease; later, it was complained of every day. In most cases the ingestion of food preceded the vomiting. In two cases the vomiting of normal ingesta was complained of. In no case was hæmatemesis observed.

Pain.—Pain was present in all but one case. It usually preceded the vomiting. In the early stages of the disease it was not severe; later, it was a most distressing symptom. Generally, it was increased by eating. Shooting or radiating pains were not recorded in any case.

Constipation.—This symptom was complained of by only two cases.

Emaciation.—Emaciation and weakness were very prominent in every case. In all of the cases but one, the wasting, anæmia, and weakness were the cause of the patient's death. The marked and rapid wasting might suggest the presence of malignant disease as the cause. When it is remembered, however, that in most of these cases the gastric mucosa had disappeared, and that the opening in the pylorus had been practically closed, it is not surprising that extreme emaciation, anæmia, and weakness were prominent symptoms. A statement made by Rosenheim[18] concerning atrophy of the stomach is of interest: "Atrophic processes in the stomach mucous membrane have a far-reaching influence upon the body economy. They occur more frequently than has been assumed, and not only relatively frequently with carcinoma, but also as a disease of the stomach for itself. They are without doubt im-

portant factors in the development of the so-called essential
anæmia, more so than they have up to now been credited with."

Examination.—Physical examination was negative in all
but one case. In this instance a movable tumor was found in
the region of the stomach, which proved to be a collection of
non-malignant tissue doubtless due to trauma.

Examination of the stomach contents, blood, and urine was
not recorded in any case. The examinations in the case that
I treated have been recorded in the foregoing.

Diagnosis.—It is difficult, or impossible, to diagnose a
case of cirrhosis of the stomach. The condition might be sus-
pected in a patient who presented symptoms of benign stenosis
of the pylorus with a contracted stomach. I believe that it
would be impossible, in any case, to exclude malignancy. The
following conditions would point to a cirrhosis of the stomach.
(1) Long-standing disease. (2) Absence of vomiting of
blood. (3) A contracted stomach. (4) Absence of a tumor
on palpation. (5) Absence of glandular or hepatic involve-
ment. (6) Improvement of the patient generally, and relief
of the stomach symptoms, for a considerable period of time,
when rectal feeding is resorted to.

Treatment.—The treatment of cirrhosis of the stomach is
surgical. I am of the opinion that patients suffering from cir-
rhosis of the stomach do not die until the pylorus has been so
nearly closed as to prevent the passage of food from the
stomach into the intestines. If the condition is non-malignant,
as we have reason to believe from the reports of the cases, and
especially in cases in which the gastric mucosa is found to be
smooth, firm, and pale when the stomach is opened, gastro-
enterostomy should be performed. This operation drains the
chronically inflamed stomach and, at the same time, allows the
food to pass into the intestines. I shall watch with great in-
terest the results in the case that I have operated upon. Should
the condition in the stomach progress, and gradually close the
artificial opening, I shall not hesitate to perform a second oper-
ation, which will be governed by the conditions found when
the abdomen is opened.

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ON THE TREATMENT OF PENETRATING WOUNDS OF THE ABDOMEN.[1]

WITH REPORT OF SIXTEEN CASES.

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WE still find some difference of opinion existing among surgeons as to the best method of handling penetrating wounds of the abdomen. It is with the hope that the author's experience during the past two or three years may aid in the solution of this question that this article is written. It is to be understood that these remarks apply entirely to cases in civil life, as the author has had no experience in military practice, and admits the circumstances in the two cases are entirely different. In civil life the wounds are almost always produced by knife-stabs in street or saloon fights, or by bullets from the ordinary pistol or revolver at short range. The cases are usually taken by the ambulance service to the hospital, where they are seen soon after. Having determined that the wound penetrates the abdominal cavity, there are two main questions which immediately present themselves, namely:

1. Has any of the viscera been injured?
2. Is hæmorrhage taking place?

With the exception of hæmaturia pointing to some injury to the urinary tract, and hæmatemesis to injury to the stomach, injuries of the abdominal viscera give rise to no characteristic symptoms whatever. When the wound of the abdominal wall is so great as to permit the partial escape of some of the viscera, or when the intestinal contents or bile are seen issuing from the wound, we have an ocular demonstration of a fact, but these conditions do not properly belong under the head of symptoms.

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[1] Read before the Chicago Surgical Society, December, 1903.

With the exception, then, of the conditions mentioned, there is absolutely not a single known symptom or group of symptoms which indicates a penetrating wound of any of the abdominal viscera. The stomach, intestine, liver, pancreas, spleen, etc., may be perforated without giving rise to any symptoms by which the fact may be known. Whenever we find symptoms in a patient with a perforating wound of the abdomen, these symptoms always indicate, not that some viscus has been injured, but *something else,* which something else, however, may or may not be the result of a perforation of the viscera. This may appear to be a distinction without a difference, but such is not the case. There is a very material and practical difference, and the sooner it is recognized by the surgeon, the more lives will be saved in this class of injuries. With the exception of shock in its general sense, which indicates nothing specific, but may be present in an injury of any kind, all of the symptoms which are usually associated with injuries of this kind are due to hæmorrhage or peritonitis. This fact cannot be too strongly emphasized. The symptoms of hæmorrhage may come on immediately and result fatally in a few minutes, or they may be delayed some time, depending on the rapidity with which the blood escapes.

The symptoms of severe hæmorrhage, such as a rapid, small, soft pulse, accelerated sighing respiration, restless body and mind, great thirst, pale pinched features, dilated pupils, dim vision, cold clammy skin, etc., are usually easily recognized; but the fact is not so generally appreciated that bleeding may take place slowly and continue for some time without giving rise to marked symptoms. Even the pulse may be maintained at a rather uniform, slow rate so long as the vasomotor system is able to preserve the arterial tension. When this gives way, serious symptoms appear rather suddenly. An abnormal area of dulness in the abdomen which does not necessarily change its location on change of body position, owing to the fact that much of the blood frequently coagulates, together with a declining red blood count, are the best evidences that a slow hæmorrhage is taking place.

Case I illustrates the effect of severe rapid hæmorrhage.

November 21, 1903. J. L., aged thirty-six years, was shot from directly in front. Bullet entered in the midline about seven centimetres below the ensiform cartilage, and had a slightly downward direction. He reached the hospital and was seen in thirty minutes from the time he was shot. He presented all the symptoms of a severe internal hæmorrhage, as defined above. The pulse was very rapid and weak, at times almost disappearing. The abdomen was opened as quickly as possible. On drawing up the omentum the cavity was found filled with blood, which welled up rapidly from the upper part. Large hot compresses were rapidly placed and the blood cleared away. On withdrawing the compresses carefully the blood was found to issue from a large wound of the root of the mesentery within a few centimetres of the beginning of the jejunum. The patient succumbed on the table from great loss of blood and shock before the full extent of the injuries could be ascertained.

Autopsy showed perforation of left lobe of liver, of anterior and posterior walls of stomach, and transverse mesocolon; two perforations of the upper end of the root of the mesentery. Bullet entered muscles of back and was found down near left hip.

As illustrating the fact that a hæmorrhage of considerable amount may take place slowly within the abdomen without giving rise to any appreciable general symptoms, the following case may be mentioned:

Case II.—J. G., aged thirty-six years. A large, strong, healthy man. While working on the corking machine in a beer-bottling establishment, a beer bottle exploded, driving a piece of glass into the abdominal cavity. He was brought to the Alexian Brothers Hospital, November 19, 1902, about noon, and was seen by the author about four hours after the accident. His general condition was excellent. There were practically no symptoms present, and he expressed himself as feeling all right in every way. Pulse was soft, fairly full, and about 75 per minute. There was an irregular wound about four to five centimetres in length in the abdominal wall to the left of the midline and about midway between the umbilicus and the costal arch. An area of dulness could be made out extending from the costal arch

to the left and downward, gradually disappearing. The urine was normal. He was operated on at once by enlarging the original wound. The omentum was found perforated and an artery of considerable size severed just as it was given off by the left gastro-epiploic artery. The lesser peritoneal cavity was filled with blood, and considerable blood was present above the transverse colon and down the outer side of the descending colon. The artery was still bleeding. No injury to any of the viscera was found. The bleeding vessel was secured and the abdomen closed without attempting to remove all the blood present. On the third day the temperature shot up to 104° F., but then became normal, and he recovered without any untoward symptoms. Left the hospital December 17, 1902, but could have gone out ten days sooner had he desired to do so.

The other symptoms which are usually described as indicating perforation of the viscera, such as rigidity of the abdominal muscles, tenderness on pressure, pain, spontaneous or on motion; tympanites, diminution or loss of liver-dulness, rapid small pulse, accelerated costal breathing, vomiting, etc., are not symptoms of perforation, but symptoms of peritonitis. The reason that the mortality following operation in this class of cases was so high, namely, 60 per cent. to 80 per cent. in the past, is that it was customary for the surgeon to wait for symptoms which would indicate that some of the viscera had been injured. This meant to wait until either the patient was in collapse from hæmorrhage, or peritonitis was so far advanced as to be beyond control.

That such practice has not yet entirely disappeared is shown by a recent article by Vincent (*Revue de Chirurgie,* 1901, xxiv, 1), who says, " In bullet wounds (of the abdomen) it is wiser to abstain from early intervention, because the possible lesions are *incertæ sedis;* because the perforations may be too numerous to be all sutured, and they may develop peritoneal adhesions capable of preventing the escape of intestinal liquids.

" In perforating wounds by sharp instruments, it is probably more advantageous to abstain; to await symptoms of

perforation or peritonitis; of a severe hæmorrhage, and to submit the patient to the action of local refrigeration by the use of ice, to repose, to a diet, and to opium."

I believe such advice to be absolutely pernicious and contrary not only to sound judgment, but to the practice of nearly all American surgeons who have had much experience in this class of cases. As there are absolutely no symptoms in the early stage which indicate a perforating wound of the abdominal contents, and as the symptoms when they do arise indicate a severe hæmorrhage or peritonitis, which in the large majority of cases means a fatal issue, there is but one safe and sound course for the surgeon to pursue, and that is to operate on these cases at the earliest possible moment. As it has been shown by Neff that in at least 95 per cent. of these cases damage which needs repair has been inflicted on some of the viscera, it is not only a useless procedure but a great waste of time to attempt to demonstrate the presence of an intestinal perforation by the rectal insufflation of gas or vapor, as recommended by Senn, Sutton, and others, or by the more recent procedure of filling the abdominal cavity with salt solution, withdrawing it later, and submitting to an analysis to determine the presence of contents of the intestinal tract, as recommended by Connell.

In the presence of a penetrating wound of the abdomen, the necessity of opening the cavity at once is so imperative that no time should be lost in useless experimentations. When the abdomen is open, the entire length of the intestinal tract should invariably be examined, as the point of entrance of a bullet or its apparent direction are absolutely unsafe as evidence upon which to speculate that this or that portion of the gut cannot have been injured. While there is a general plan of arrangement of the intestine, this is by no means constant, and one is continually meeting with surprises in these cases. A loop of bowel after being injured may in a very short time move itself to a remote portion of the abdominal cavity, making it appear quite impossible that so many widely separated injuries could have been produced by a bullet travelling in a straight line.

This fact is well illustrated by the following case:

CASE III.—July 26, 1903. J. B., aged thirty-four years. While in a fight with another man he was shot from in front at close range. The bullet entered the left side of the abdomen about five centimetres above and a little posterior to the anterior superior spine of the ilium. The patient reached the Alexian Brothers Hospital about twenty minutes later in good condition. Pulse, 92; temperature, 98° F.; respiration, 22. Thirty minutes after the injury a blood count showed 4,400,000 reds and 8500 whites. Urine negative. Abdomen was soft; no special tenderness. Stomach was washed out, as it was filled with food and beer. Some blood appeared in the washing, which was attributed to the passing of the tube, as the patient had been drinking enough to offer resistance. Operation, within an hour of the time of the shooting; muscle-splitting incision at the site of the bullet hole. The sigmoid flexure was encountered first. In this were found two perforations, one quite low down near the pelvic brim, so low that it was reached and sutured with difficulty. Four perforations were found in the jejunum near the middle portion. These were thought to be all the perforations, but the colon and stomach were examined as a matter of routine. On drawing down the transverse colon, which was well to the upper part of the abdomen, much to our surprise, two perforations were found in it. It seems almost impossible that a bullet entering at the point indicated in this case and travelling approximately from before backward could perforate the sigmoid low down, the transverse colon twice, and the jejunum four times; yet such are the facts, which are explainable by the great mobility of nearly all parts of the intestinal tract. Although this abdomen was opened within an hour of the time of the shooting, intestinal contents were found distributed from the upper to the lower part of the cavity. Thorough irrigation with salt solution was employed and four cigarette drains placed. Death on the fourth day from peritonitis. At the autopsy all the perforations were found well closed and none had been missed.

Another similar example is that of Case IV.

CASE IV.—June 28, 1903. J. McC., aged thirty-six years. Shot from in front with a revolver at short range. Bullet entered

right iliac region about McBurney's point. Patient reached hospital within an hour in very good condition, and was operated on within two hours. Abdomen opened at seat of wound. One very large hole was found in the cæcum with considerable hæmorrhage from a branch of the ileocolic artery. This had spread into the retrocolonic space as well as into the free cavity. Three perforations were found in the jejunum about fifty-four centimetres from the upper end, one bruise of jejunum lower down about two centimetres in diameter, which was turned in; one perforation of mesentery near intestinal border. All perforations closed with silk. Abdomen irrigated with hot salt solution. Four cigarette drains placed. No trouble with abdomen, but on eighth day patient developed pneumonia, with temperature from 102° to 103.5° F. for about ten days. This subsided, and he made a good recovery.

As illustrating the difficulty or at times impossibility of finding perforations of the stomach, the following case is given :

CASE V.—O. B., aged nineteen years, was shot July 19, 1903, while trying to escape from a " hold-up" man. The bullet entered the eighth interspace in posterior axillary line on the left side and took a transverse direction. He reached the hospital about forty minutes later in considerable shock, and complained of great pain in the chest and back. Pulse, 110; respiration, 28. Blood count showed 4,800,000 reds, 9800 whites. Urine negative. It was evident the left pleura and lung had been injured, and from the course of the bullet it seemed certain that it must have perforated the diaphragm and traversed the abdominal cavity. A median cœliotomy was therefore made about one and one-half hours after the shooting. A large hole was found in the diaphragm, through which blood and air passed in and out of the pleura. This was packed with gauze. Two perforations were found in the splenic flexure of the colon, which were closed by suture. It did not seem possible that the stomach could have escaped, but very careful examination failed to reveal any injury to it. It was quite well distended, but no leak could be found. The patient's condition was bad, and, as no further wounds could be discovered, cigarette drains were placed and the operation

terminated. Five hours after the operation the patient was paraplegic, and in twelve hours he was dead. Autopsy showed perforation of left pleura and lung with some blood and air in pleural cavity; perforation of diaphragm; two perforations of splenic flexure of colon (closed by suture) ; two perforations in cardiac end of the stomach near œsophagus, in what may be called the extraperitoneal portion of the stomach. These openings had not permitted any of the contents of the stomach to escape; injury to lower dorsal vertebræ with hæmorrhage into the spinal canal, compressing spinal cord; perforation of right side of diaphragm with hæmorrhage into the right pleural cavity.

Case VI.—February 15, 1903. L. P., aged thirty years. During a quarrel was stabbed in the abdomen and chest. He was somewhat under the influence of liquor, but otherwise in good condition when he reached the hospital about half an hour later. Was operated on within two hours from the time he was stabbed. One stab wound, about two and one-half centimetres in length, was situated just above the right anterior superior spine of the ilium. A loop of small intestine protruded through this wound. A second wound, about two centimetres long, was situated between the eleventh and twelfth ribs, about seven centimetres to the right of the vertebral spines. This opened the pleural cavity and perforated the diaphragm. The wound was cleaned and packed with gauze. The wound of the abdomen was enlarged, and two cuts, one and one-half centimetres and one-half centimetre respectively in length, were found in the ileum, and one small cut in the cæcum. These were all closed and two cigarette drains placed. Patient made an uninterrupted recovery.

Case VII.—H. J., aged fifty-two years, was injured November 11, 1902, in a street-car accident. A piece of glass from a broken window produced a somewhat irregular wound about ten centimetres in length, extending obliquely across the upper portion of the right side of the abdomen. The wound penetrated the abdominal cavity, and a loop of the small intestine several centimetres in length, which had also been cut by the glass, protruded from the wound. He was seen within an hour after the accident. The intestine was sutured, thoroughly cleansed, and replaced; two cigarette drains introduced and a part of the external wound closed with suture. The patient recovered without interruption.

CASE VIII was a bullet wound of the liver. T. G., aged twenty-four years, shot, March 2, 1903, while trying to " hold-up" a saloon keeper. The bullet entered about five centimetres to the left of the midline and six to eight centimetres above the umbilicus. When he entered the Passavant Hospital his pulse was 124, fair volume; temperature, 99° F. Had been drinking. Was seen and operated on within two hours of the shooting. Median incision. The track of the bullet was from before backward and from left to right. The bullet entered the left lobe of the liver, passed through the entire breadth of this organ, and escaped from the posterior border on the right side. It penetrated the body wall behind and lay just beneath the skin. He was bleeding quite freely from the point of entrance and exit in the liver, and considerable blood was found in the abdominal cavity. The openings in the liver were packed with gauze. It was rather difficult to reach the posterior wound, but this was done, and the ends of the gauze strips were brought out of the anterior incision. The incision in the abdominal wall was closed, with the exception of space for the drain. Packing removed in about a week. Recovered and left hospital April 1, 1903.

CASE IX.—February 17, 1903. A. B., aged fifteen years, shot himself accidentally with a 22-caliber revolver. After the accident he ran three blocks, then fainted. Was brought to the Alexian Brothers Hospital about 11.30 A.M. Blood count on entrance, reds 4,205,000, white 6000. Three hours later, blood count, reds 4,120,000, whites 12,000. General condition good. Urine negative. Bullet entered slightly to left of midline about four centimetres above the umbilicus. Operation about five hours after he was shot. Median incision. Small amount of blood in peritoneal cavity. Careful search failed to reveal any injury to any of the viscera. The bullet fell from a fold of omentum as this was being straightened out preparatory to closing the incision. The bullet had not injured the omentum in the least. Its force was just sufficient to penetrate the abdominal wall. Wound closed. Uninterrupted recovery.

CASE X.—A. S., aged seventeen years. On August 19, 1903, he was struck in the abdomen just above the pubis by a bullet fired from a revolver. Bullet ricocheted from a stone wall before striking him. Patient in good condition when he reached Alexian Brothers Hospital. No bladder or rectal symptoms. Operation,

median incision, passing through the tract of the bullet. No injury to any of the viscera. Bullet found somewhat flattened on the inner side of the symphysis pubis near its lower border. Wound drained with gauze. Recovery uneventful.

CASE XI.—Mrs. B., aged twenty-five years. Shot herself with a 32-caliber revolver. Bullet entered abdomen to the left of midline about midway between umbilicus and costal arch. She was brought to the Policlinic Hospital within a few minutes of the shooting. She showed distinct symptoms of internal hæmorrhage and the pulse was quite rapid and small. Was operated on about an hour and a half after the accident. Median incision, considerable blood in the abdominal cavity. There were found one perforation of the omentum, which was bleeding; two perforations of the jejunum, and four perforations of the mesentery. These were all closed with silk. Abdominal incision closed. Uneventful recovery. Bullet, which lay just beneath the skin of the back to the right of the spine, was removed later under local anæsthesia. Left hospital at the end of three weeks.

CASE XII.—M. L., aged eighteen years. During a fight was stabbed in the abdomen. Knife entered in the midline just above the umbilicus. Reached the hospital shortly after and was seen and operated on within an hour. Omentum was protruding from the wound. The wound was enlarged, protruding omentum ligated and removed. One good sized wound of small intestine found, which was sutured with silk. Abdomen closed without drainage. Uninterrupted recovery. Left hospital on twenty-first day.

CASE XIII.—Mr. F., aged twenty-six years. Was in the same fight that Case XII was. Entered the Policlinic Hospital and was operated on at the same time. Received several stab wounds. Three wounds in the right posterior side of the chest, through one of which air was whistling in and out with respiration, four stabs in left arm and forearm, one stab in left thigh and one stab six centimetres to the left and two and one-half centimetres above the umbilicus, from which omentum was protruding. This wound was enlarged and the protruding omentum ligated and removed. One perforation was found in the jejunum and a slit cut in the transverse mesocolon. These were closed with silk. Abdomen closed without drainage. Wound of pleura was cleaned and packed with gauze. Other wounds dressed.

Recovered without incident and left hospital on the twenty-first day.

Case XIV.—I. R., aged twenty-six years. Shot September 30, 1903. Bullet entered abdomen a trifle above and two and one-half centimetres to the left of the umbilicus. Its direction was oblique from left to right. Entered Alexian Brothers Hospital about thirty minutes after the shooting in good condition. Operation, median incision. Two perforations in transverse colon and one in hepatic flexure were found, which were closed by silk suture. A counter-opening was made well back on right side of abdomen, through which was introduced a cigarette drain just above the hepatic flexure and transverse colon. Abdomen closed in front. Considerable thick tenacious yellowish fluid escaped along the drain for three or four weeks. It appeared to be bile-stained, but failed to give the reactions for bile. On November 18 he suddenly, and without permission, escaped from the hospital. He was in excellent condition and had practically recovered, but the small drain opening had not quite closed.

Case XV.—J. K., aged twenty-five years. Shot, November 14, 1903, with a 38-caliber revolver. Bullet entered abdomen on a line with the umbilicus about ten centimetres to the left and lay directly under the skin in the back about ten centimetres from the spine. Entered Alexian Brothers Hospital in good condition, except that he had been drinking considerable beer. Pulse was 90 and full, and there were no symptoms of shock. He was operated on about three hours after the shooting. Muscle-splitting incision at seat of bullet wound. There were found one perforation in colon near beginning of sigmoid; one severe bruise in descending colon; two very large perforations about two and one-half centimetres apart in upper part of jejunum; two bad bruises of jejunum near perforations. Perforated part of jejunum had moved to upper part of abdominal cavity quite a distance from point of entrance of bullet. Intestinal contents had escaped about adjoining loops. Entire small intestine was washed with hot salt solution as it was drawn up and examined. Perforations were closed and bruises turned in with silk. Four cigarette drains placed, two about loop of jejunum and two about colon. Uninterrupted recovery.

Case XVI.—The last case to be reported was that of a lad sixteen years of age. He ran across the street to see a fight,

and was stabbed in the abdomen. Knife entered a little above and about four centimetres to the right of the anterior superior spine of the ilium. He was brought to the Alexian Brothers Hospital, where he was seen and operated on within two hours of the accident. General condition good and no symptoms of shock. The wound was enlarged and the intestine examined. One loop of ileum was found to have been transfixed by the knife, almost severing the gut, and an adjoining loop entered, making three wounds altogether. These were closed with silk suture and cigarette drains placed. He made an uninterrupted recovery.

In our sixteen cases of penetrating wounds of the abdomen there were three deaths. Case I died quickly from rapid, profuse internal hæmorrhage before the source of the hæmorrhage could be discovered and controlled. It may therefore be excluded. Case V may also be excluded, as death was due to shock from injury to both lungs and pleuræ and to the spinal cord.

Excluding these two cases, we have fourteen cases remaining with but one death, Case III, with eight perforations involving the sigmoid, small intestine, and transverse colon, with death on the third day from peritonitis. While in Case II no injury to any of the viscera was found, still, operation was imperative on account of hæmorrhage. In Cases IX and X neither injury to the viscera nor excessive hæmorrhage was found.

It may be claimed that these cases would have recovered without operation, and this is undoubtedly true; but who could have foretold before the abdomen was opened? The operation not only did no harm, but was productive of good, as the bullet, which might have given rise to subsequent trouble, was removed in each case.

But excluding these cases, we still have eleven cases with perforations and hæmorrhage in which operation was absolutely indicated with but one death. Instead of the usual mortality rate of 60 per cent. to 70 per cent. following operation, we have over 90 per cent. recoveries.

The reasons for this, according to the author's opinion, are chiefly two:

First. Immediate operation. All cases but one were operated on within three hours or less of the time of the accident.

Second. Drainage when the gastro-intestinal tract has been opened.

Every case in which the gastro-intestinal tract has been perforated must be considered an infected wound. Because rarely a case may recover without operation, in which the intestine has been opened, although the proof of this latter point is almost always wanting, except when a fæcal fistula forms, is no reason why the large majority of these cases should be subjected to a so-called conservative treatment, which almost certainly ends in death, in order to save the rare case from what may be thought an unnecessary operation.

The question of drainage in this class of cases was thoroughly discussed at the meeting of the American Surgical Association, 1902 (*Transactions of the American Surgical Association, 1902*), and the consensus of opinion was in favor of drainage.

In conclusion, I wish to emphasize the following points:

1. In penetrating wounds of the abdomen, there are absolutely no known symptoms which indicate injury to any of the viscera, except those noted above in connection with the urinary tract, stomach, and occasionally the lower bowel.

2. Except those relating to general shock, all symptoms following such wounds indicate either internal hæmorrhage or peritonitis.

3. To wait for symptoms of perforation of the intestine means to wait until peritonitis has developed, therefore,

4. Every bullet or stab wound which penetrates the abdominal cavity should be operated on at the earliest possible moment in order to anticipate the advent of peritonitis.

5. No time should be wasted in attempting to demonstrate the presence or absence of intestinal perforation by such means as the rectal insufflation or gases or vapors, or the analysis of recollected intraperitoneally injected air or liquids.

6. It is essential to systematically examine the entire

gastro-intestinal canal in all cases, regardless of the point of entrance of the wounding body.

7. Whenever the alimentary canal has been perforated, suitable drains (the author prefers the so-called cigarette drains) should be placed either through the operative incisions or counter-incisions, as may appear best suited to the individual case.

UNILATERAL HÆMATURIA FROM CHRONIC NEPHRITIS.

RECOVERY AFTER DECAPSULATION OF KIDNEY.

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THE most common cause of obscure renal bleeding is perhaps tuberculosis. Next in frequency comes chronic nephritis, usually of the interstitial type, and often attacking the glomeruli. It may be bilateral or unilateral; it may involve the entire kidney, or appear in small portions of the organ only, which has often led, no doubt, to its non-recognition.

Every physician knows that minute quantities of blood often appear in the urine of patients having interstitial nephritis, especially in its advanced stages; but few seem to be aware that copious and prolonged hæmorrhages may arise, even when the disease is comparatively trivial, as has been demonstrated in many cases during recent years.

Either medical or surgical treatment will be employed according to the amount of the hæmorrhage, the condition of the patient, etc.; but it is noticeable that the tendency is more and more towards operation, in severe cases at least.

The following operations have been employed: Nephrectomy, Nephrotomy (with closure of wound or with packing), Decapsulation, Acupuncture, Nephropexy, and Simple exposure of the kidney by lumbar incision.

Nephrectomy should seldom, if ever, be done in chronic nephritis because of the immediate or remote danger of involvement of the other kidney, several disasters having occurred from lack of recognition of this fact.

Nephrotomy has been the operation of choice in the past, and has scored many successes. The manner in which it effects a cure is not readily understood. Some claim that relief of tension through division of the fibrous capsule is the prime

factor; while others contend that the result is obtained by relief of congestion through the formation of new blood-vessels in the adhesions following operation.

It has also been asserted that nervous influence is the principal feature; while Senator (*Deut. med. Woch.*, 1902, No. 8) is convinced that it is the mere breaking up of adhesions or the fixation of a more or less movable organ.

It may be that these explanations are all applicable at different times, according to the nature of the case; but I am inclined to think that the astonishingly rapid disappearance of the bleeding, which so often takes place, is due to local depletion, and that permanent hæmostasis depends upon the growth of new vessels in the perirenal adhesions. In opposition to this view, however, I have seen a profuse renal hæmaturia, in connection with enlargement of the prostate, immediately cease, following a suprapubic cystostomy. Similar observations have been made by others.

Decapsulation, which has recently attracted so much attention in the treatment of chronic nephritis, has been attended with fair success. Seeing that many obscure cases of renal hæmaturia are now known to arise from nephritis, it would seem rational to select decapsulation as the operation of choice rather than nephrotomy, because, in addition to stopping the hæmorrhage as effectively, at least, as the latter, it appears to be the best method at our command for checking the nephritis.

Acupuncture, although advocated at one time, is no longer to be considered. It is good so far as it goes, but it accomplishes less than either nephrotomy or decapsulation.

Nephropexy is required in movable kidney only. As done by most surgeons, it involves a preliminary decapsulation, which may often account for some of the good effects obtained.

Simple exposure of the kidney by lumbar incision has on several occasions caused immediate cessation of hæmaturia (Eshner, *American Journal of the Medical Sciences*, Vol. i, 1903, p. 636; Broca, *Centralblatt für Chirurgie*, 1895, p. 237), a phenomenon which is rather difficult of explanation except

on the theory of nervous influence or by the previously noted suggestion of Senator.

Operations for renal hæmaturia, especially decapsulation, are sufficiently uncommon to warrant the relation of the following case history.

The patient, who was referred to me by Dr. J. E. Kinney, was an Irishman, fifty-nine years of age, well built, but very anæmic and considerably emaciated. He first noticed blood in the urine about twenty years ago, since when he has had repeated attacks of bleeding lasting from a few days to a few weeks. The hæmorrhage was often profuse, not to say alarming, the urine being opaque with blood and often thick with clots. At times a jelly-like coagulation would take place in the vessel as soon as the urine was voided. For an entire year previous to the operation the patient had bled constantly and profusely until so weak, anæmic, and emaciated that he could scarcely get about. At various times during his illness pain was experienced over the bladder, but none along the ureters or over the kidneys. There were no uræmic symptoms.

Internal medication failed completely; the suprarenal extract, among other things, being pushed to the limit.

Segregation with the Harris instrument showed that the bleeding came from the left kidney alone, the urine from the right side being normal in color and perfectly clear, although it contained a few hyaline and granular casts and a trace of albumen, which may have come from an imperfect cleansing of the bladder. The total quantity of urine in twenty-four hours was about fifty ounces. (It seems superfluous to add that no operation should be done in these cases without previous separation of the two urines when this is possible.)

There was hypertrophy of the heart and atheroma of the arteries, as determined by Dr. J. N. Hall, who also estimated the percentage of hæmoglobin at about thirty.

The left kidney could not be palpated with certainty, and there was no tenderness; in fact, nothing to call attention to the origin of the hæmorrhage.

A provisional diagnosis was made of unilateral renal hæmaturia from chronic interstitial nephritis, which was concurred in by Dr. Hall. Decapsulation of the left kidney was advised, and

the patient put to bed and given iron and strychnine until the hæmoglobin increased to about 50 per cent.

Operation, June 15, 1903.—Under chloroform, a longitudinal lumbar incision was made; the kidney, which was normal in size, shelled out of its adherent fatty capsule, delivered with difficulty through the wound, and decapsulated. The surface was granular, mottled yellowish-gray, and the fibrous capsule adherent. Considerable hæmorrhage from the cortex occurred, which was with difficulty checked by prolonged pressure. (Attention has also been called to this bleeding by Albarran, *Centralblatt für Chirurgie,* 1900, p. 24.) The operation lasted thirty minutes.

Recovery was uneventful. During the first twenty-four hours thirty (30) ounces of urine were passed, and during the second twenty-four hours, fifty (50) ounces. The blood rapidly vanished from the urine, which became clear during the night following the operation, that is, within eighteen hours. Many granular and hyaline casts were then found.

During the ten weeks which have elapsed since the operation there has been no return of the hæmaturia. The patient has gained twelve pounds in weight, and has regained strength and energy to an astonishing degree. Analysis of the urine on August 25, 1903, shows it to be normal in color and perfectly clear, with a specific gravity of 1022; no albumen, no blood-corpuscles, and no casts. Another examination on November 12, 1903, gave similar results. On February 22, 1904, the patient reports himself in excellent condition. Hence, there seems to be recovery not only from the hæmaturia, but also from the chronic nephritis.

A small piece of the renal cortex, which was removed during the operation, was subjected to microscopic examination. It showed a marked glomerulonephritis with abundant small-celled infiltration between the tubules. Some of the glomeruli were almost entirely replaced by connective tissue. There was also advanced arteriosclerosis. It is worthy of remark that in the literature of the subject glomerulonephritis seems to occupy a more prominent position than do other renal lesions.

Conclusions.—(1) A prominent cause of renal hæma-

turia, which is often unilateral, is chronic interstitial nephri-
tis, often involving the glomeruli.

(2) This, together with other obscure causes, must be ex-
cluded before a diagnosis of " essential hæmaturia" can be
made.

(3) Decapsulation of the kidney is indicated in these
cases, as it offers a good prospect for cure of both the hæma-
turia and the nephritis.   Nephrectomy should be discarded on
account of probable involvement of the other kidney.

PRIMARY CARCINOMA OF THE BULBOUS URETHRA.

A STATISTICAL DIGEST, WITH REPORTS OF SOME UNRECORDED CASES.

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DURING the year 1901 a case of primary carcinoma of the bulbous urethra was admitted under my care at the Bradford Royal Infirmary, and by a strange coincidence another case was admitted under my colleague, Dr. Jason Wood, within a few weeks. After a careful search, I have succeeded in compiling a list of twenty-one cases in which the diagnosis has been confirmed by microscopic examination. There are also on record five cases in which no such examination was made. Three cases are also on record in which the growth arose primarily in Cowper's glands. This material apparently represents all that is known of this very rare disease. The literature of the subject is very meagre. A good description of the disease is given by Kaufmann,[1] and in 1892 Beck[2] recorded a case and gave a *résumé* of ten cases which he was able to collect from various sources. The most complete list of cases hitherto published is given by Patterson [3] in a " Statistical Digest of Epithelioma of the Penis." In it, however, there is no record of the microscopic examinations. Beyond these papers, I have been unable to find anything except the reports of isolated cases. It occurred to me, therefore, that an accurate record of all the cases I could collect would serve a useful purpose, even if it does nothing more than provide a convenient source for future reference. I am much indebted to W. P. Montgomery for notes of two unpublished cases, and to my colleague, Dr. Jason Wood, for a report of the case which was under his care.

My own case, which I now publish for the first time, is as follows:

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J. W., aged forty-nine years, was admitted into the Bradford
Royal Infirmary on November 11, 1901, suffering from a perineal
abscess. He stated that he was quite well until ten days pre-
viously, when a swelling appeared in the perineum accompanied
by much pain. There was no difficulty in passing urine, neither
had there ever been any. In my absence, Mr. Phillips, my house
surgeon, incised the abscess under ether anæsthesia. A full-sized
Lister's bougie was easily passed into the bladder. The patient
left the hospital on November 30, 1901. There was still a sinus,
but no urine came through it, and it was apparently closing. He
did not attend the hospital again until June 25, 1902. He then
stated that the sinus had never quite healed, and that during the
last six weeks of the period which had elapsed it had grown very
much bigger, and all his urine now passed through it. He had
lost a stone in weight. On examination there was found a fissure-
like ulcer in the perineum one and a half inches long, with broad
everted edges. (Fig. 1.) Beneath it was a solid ovoid mass
extending deeply into the perineum and surrounding the urethra.
Per rectum, this mass was felt to be quite distinct from the pros-
tate, and lay anterior to the triangular ligament. The whole
appearance of the growth was typical of carcinoma. The inguinal
glands were not enlarged, and, apart from emaciation, the general
health was good.

On July 2, 1902, ether was administered, and the mass freely
excised together with the anterior layer of the triangular ligament.
The bulbous portion of the urethra was completely buried in the
growth, and it was evident that infiltration had already extended
beyond the limits of operative interference. The wound, however,
healed well, leaving a perineal fistula, through which the urine
was passed. The patient had complete control. At the end of
a month he went to a convalescent home. The growth, on
microscopic examination, proved to be a typical squamous epithe-
lioma. Three months later a recurrence appeared (Fig. 2), which
grew rapidly, and he died nine months after the operation from
exhaustion. There was never any retention or incontinence from
first to last, neither was there any pain or suffering. At the
time of his death, the perineum was occupied by a fungating
ulcer as large as a man's hand. The inguinal glands became
enlarged during the last three months. No post-mortem exami-
nation was allowed.

FIG. 1.—Photograph of the primary growth taken just before operation.
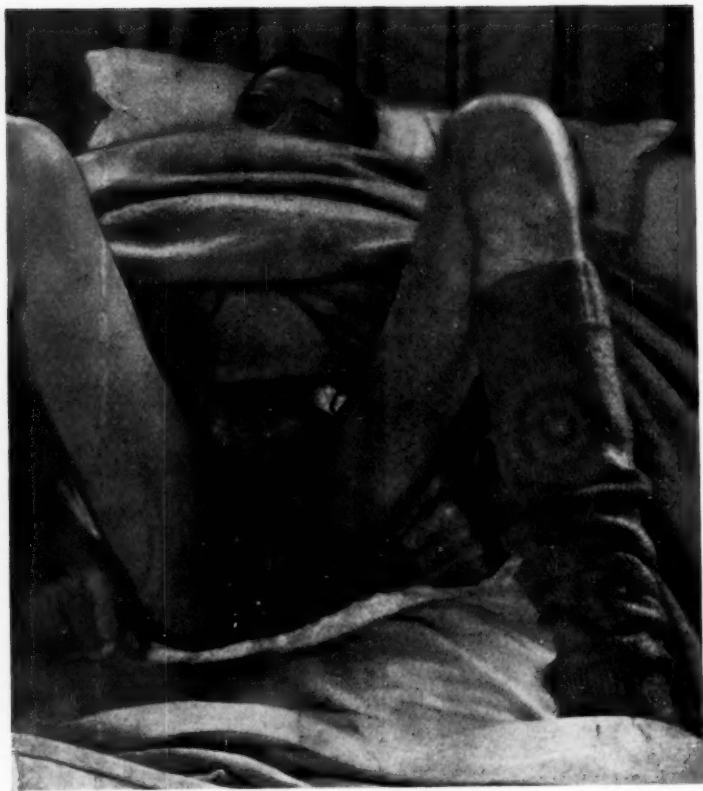
Fig. 2.—Photograph showing recurrent growth in the perineum a fortnight before death.

The report of Dr. Wood's case is as follows:

J. J., a laborer, aged forty-eight years. Admitted into the Bradford Royal Infirmary with chronic retention of urine. He gave a history of six months' increasing difficulty in passing urine, which he attributed to the presence of a swelling in the perineum. He has had little or no pain, but he cannot voluntarily pass urine, although it is always dribbling away from him. He has lost flesh rapidly. On his admission the bladder was distended above the pubes, although a catheter passed easily into it. In the perineum was a brawny swelling extending into the scrotum. It was well defined and without any surrounding cellulitis. The inguinal glands were slightly enlarged.

Ether was administered and the swelling incised, and found to surround the bulbous urethra, which consisted of a ragged cavity containing much débris. Three weeks later the patient died of septic absorption. At the post-mortem examination the mass in the perineum was found to consist of a carcinomatous growth closely adherent to the triangular ligament. It had eroded the pubic bone, but had not extended to the prostate. The inguinal glands were infected. Under the microscope, the growth proved to be a typical squamous epithelioma.

In both these cases there was no history of venereal disease, neither had the patients suffered from any symptoms of urethral stricture prior to the onset of the disease. The previous history of Montgomery's two cases is also similar in these respects. The details of his cases are as follows:

The first case occurred in a man aged fifty-three years. There was a well-localized growth situated three inches from the meatus. A total extirpation of the penis and crura was performed. When last seen, four months after the operation, there was no recurrence. Microscopically the growth was a squamous epithelioma.

In the second case, occurring in a man aged forty-seven years, there was a perineal abscess following on a six months' history of stricture. Perineal section was performed. Death occurred three months later. In this case, also, the diagnosis of squamous epithelioma was proved by microscopic examination.

After a careful examination of the cases I have been able to collect, I have tabulated them in three classes; firstly, those

PRIMARY CARCINOMA OF URETHRA.

I.—RECORD OF CASES CONFIRMED BY MICROSCOPICAL EXAMINATION.

	Date.	Reporter.	Reference.	Age of Patient.	Treatment.	Microscopical Report.	Result.
1	1861	Hutchinson.	Trans. Path. Soc. Lond., xiii, 167.	22	Amputation of penis.	Squamous carcinoma	Slight recurrence 3 months later. Removed. Well 8 months later.
2	1865	Thiersch.	Der Epithelial krebs Namentlich der Haut, p. 283.	60	Perineal section.	"	Death 1 month later.
3	1881	Schustler.	Wiener medicin. Wochenschrift, p. 120.	72	Incision of abscess.	"	Death in 6 months.
4	1881	Poncet.	Gazette Hebdomadaire, p. 282.	60	Excision.	"	Death in 8 months.
5	1883	Guyon.	Ann. des Mal. des Organ. Gén.-Urin, p. 513.	52	Incision of abscess.	"	Death in 5 months.
6	1884	Mikulicz-Trzebiski.	Wien. med. Wochenschrift, xx, xxi.	68	Amputation of penis.	"	Recurrence in 6 months.
7	1885	Paul.	Lancet, i, p. 1127.	54	Perineal section.	"	Death in 7 months.
8	1889	Griffiths.	Trans. Path. Soc. Lond., xl, p. 177.	70	Perineal section.	"	Death in 1 month.
9	1891	Czerny-Witzenhausen.	Beiträge zur klinischen Chirurgie, vii, p. 571.	55	Perineal section.	"	Death in 18 months.

						Squamous carcinoma	
10	1891	Czerny-Witzenhausen.	Beiträge zur klinischen Chirurgie, vii, p. 571.	48	Excision.		Death in 6 months.
11	1893	Beck.	International Clinics, ii, p. 256.	61	Perineal section.	"	Lost sight of.
12	1893	Oberlander.	Internat. Centralblat. f. Ham. u. Sex. Organ., iv, p. 244.	69	Resection of urethra.	"	No recurrence in 21 months.
13	1894	Albarran.	Congrès de Chir. Francais, Lyons, Eighth Session, p. 140.	43	Total emasculation.	"	Death in 9 months.
14	1895	Buday.	Langenbeck's Archives, xlix, p. 101.	67	Amputation of penis.	"	?
15	1895	Bazy Carcy.	Thèse de Paris, May 30, 1895.	62	Total emasculation.	"	No recurrence in 10 months.
16	1895	Fuller.	Journ. Cut. and Genito-Urin. Diseases, p. 158.	An old man.	No treatment.	"	Death.
17	1901	Montgomery.	Medical Chronicle, June, 1901.	54	Perineal section.	"	Death in 9 months.
18	1902	Montgomery.	Personal communication.	53	Amputation of penis.	"	No recurrence in 4 months.
19	1902	Montgomery.	Personal communication.	47	Perineal section.	"	Death in 3 months.
20	1902	Jason Wood.	Personal communication.	48	Perineal section.	"	Death in 1 month.
21	1903	Basil Hall.	Present case.	50	Excision.	"	Death in 9 months.

II.—DOUBTFUL CASES.

	Date.	Reporter.	Reference.	Age.	Treatment.	Remarks.
1	1835	Thiaudière.	Schmidt's Jahrbuch, Band vii, p. 83.	Young (?)	Excision.	Not confirmed by microscopic examination. Kaufmann rejects this case on clinical evidence also. (Verletzungen und Krankheiten der mänlichen Harnröhre, 50.a, 1886.)
2	1867	Billroth.	Chirurgische Klinic, Zürich, p. 344.	50	?	Induration one and a half inches long in urethra first in front of scrotum. Enlarged inguinal glands. Not confirmed by microscopic examination. This case is also rejected by Kaufmann. (Ibid.)
3	1881	Poncet.	Gazette Hebdomadaire, p. 282.	56	Refused treatment.	Not confirmed by microscopic examination. Died in five months.
4	1885	Albert.	Lehrbuch der Chirurgie, Dritte Aufl., Band iv, p. 230.	55	?	Long induration commencing at seat of old gonorrheal stricture. Secondary nodules in corpora cavernosa and in one crus. Not confirmed by microscopic examination.
5	—	Grünfeld.	Die Endoscopie der Hamröhre, etc., Deutsche Chirurgie, Lief. 50, p. 193.	59	?	Died in three months. Diagnosis was made by endoscopic examination. Growth commenced in prostatic portion of urethra.

III.—Growths arising Primarily in Cowper's Glands.

	Date.	Reporter.	Reference.	Age.	Treatment.	Remarks.
1	1884	Paquet and Hermann.	Jour. de l'Anat. et de Physiol., 1884, p. 615.	65	Excision with thermocautery.	Complete recovery. Microscopic report. Epithelioma, the stroma of which has undergone hyaline degeneration. (Cylindroma?)
2	1884	Kocher.	Deutsche Chirurgie, Lief. 50.a.	57	Excision.	Small recurrence removed eighteen months after the first operation. Recovery. Microscopic report. Partly typical glandular carcinoma and partly cylindroma. (Langhans.)
3	1885	Pietrzikowski.	Zeitschrift für Heilkunde, 1885, vi, p. 421.	19	Excision of growth and inguinal glands.	Four months later secondary growths in abdomen. Microscopic report. Carcinoma very rich in cellular elements. Beck suggests alveolar sarcoma. (Internat. Clinics, 1892, Vol. ii, Second Series, p. 263.)

in which the diagnosis has been confirmed by microscopic examination; secondly, those in which no such examination was made and which must therefore be called doubtful cases; thirdly, the three cases of growth arising primarily in Cowper's glands.

The four cases now recorded for the first time, namely, those of Montgomery together with Wood's and my own, are included in the first class. These cases, together with seventeen others which have been previously recorded, make up a total of twenty-one undoubted examples of the disease. Of the doubtful cases, five in number, three have already been rejected by Kaufmann on the ground of insufficient clinical evidence, namely, those of Billroth, Albert, and Thiaudière. Poncet's case is equally inconclusive. (It may be noted here, to prevent confusion, that Poncet has recorded two cases, one confirmed by microscopic examination and the other not so confirmed.) I have included Grünfeld's case in this class; but as the growth was said to have probably originated in the prostatic urethra, it has no right to a place except for the sake of completeness. The three cases of growth arising primarily in Cowper's glands have already been fully reported and also reviewed by Beck;[2] so that no further mention need be made of them here.

There remains, therefore, for consideration a list of twenty-one cases of undoubted epithelioma of the bulbous urethra. In reviewing the symptoms of this disease, Beck[2] wrote as follows: "Primary cancer of the urethra occurs in men over fifty who have most commonly suffered from some previous disease of the canal, usually gonorrhæal stricture. The most prominent symptom is the gradual formation of a hard, lobulated mass round the urethra. Micturition becomes increasingly difficult, and is almost always very painful, far more so than in simple stricture. Hæmorrhage, especially before and after micturition, seems to be a common symptom. As the growth extends, the crura and corpora cavernosa become implicated, and the disease advances past the scrotum into the penile portion of the urethra. The glands in the groin en-

large, and the patient becomes cachectic in appearance. The passage of instruments is from the beginning difficult, and is always followed by bleeding." In the light of experience gained from a larger number of cases than Beck had at his disposal at the time of his publication, it is evident that some of the symptoms he enumerates cannot be relied upon with any degree of certainty. In the cases observed by Wood, Griffiths, Montgomery, and myself, for example, there was a marked absence of pain and hæmorrhage, and in two of these instruments passed with great ease into the bladder. Moreover, the amount of induration associated with simple stricture varies within wide limits. Indeed, after a careful review of all the cases, I am forced to the conclusion that a differential diagnosis between malignant disease and simple induration is frequently impossible prior to operation, excepting when the size of the perineal swelling is out of all proportion to that usually found associated with simple stricture. Unfortunately, the rarity of malignant disease in this situation is such that suspicion is not easily aroused under any circumstances. As many of the cases hitherto have been only briefly reported, it is impossible to give actual figures; but there is no doubt that in many instances the diagnosis has only been made during or after an operation. It is very necessary, therefore, always to bear in mind that such cases do occasionally occur, and whenever a patient presents himself for examination with a well-marked perineal swelling, the possibility of malignancy should be carefully considered. As regards treatment, in half the cases it has been palliative and in the other half radical, after excluding one case (Fuller's) in which no treatment was adopted. Perineal section or simple incision was done in ten cases. In one of these (Beck's) the patient was lost sight of, but he certainly could not have lived more than a few weeks. One lived eighteen months, and the remaining eight all died within nine months.

Of the ten cases treated by resection or some form of extirpation, the result is unrecorded in one. Of the remaining nine, death occurred within nine months in four, and one is

stated to have had a recurrence within six months of the opera-
tion. Of the remaining four the subsequent history is incom-
plete, it being merely stated that there was no recurrence at
twenty-one months, eleven months, ten months, and four
months respectively. Whilst the results of treatment, there-
fore, are not encouraging, extirpation is worth a trial, pro-
vided the disease is recognised in an early stage. The growth
invariably spreads towards the penis, and shows no tendency
to invade the prostate and tissues behind the triangular liga-
ment. Lymphatic infection occurs in the inguinal glands, and
is therefore also amenable to surgical treatment.

With our present lack of knowledge regarding the etiology
of malignant disease, the rarity of its occurrence in this situa-
tion must at present remain a mystery. It is evident, however,
that the urethra of all situations should be a common one for
cancer if Cohnheim's theory or the theory of chronic irritation
be accepted. On the other hand, if a specific micro-organism
be invoked as the essential cause, it is difficult to understand
this immunity of the urethra from cancer, especially when it
is remembered how easily the gonococcus infection is obtained
in this situation.

REFERENCES.

[1] Injuries and Diseases of the Male Urethra, 1886.
[2] International Clinics, Vol. ii, Second Series, 1892.
[3] University of Pennsylvania Medical Bulletin, July, 1901.
[4] Medical Chronicle, June, 1901.

COMPLICATIONS AND SEQUELS OF PROSTATECTOMY.

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At the present time no single operator has had sufficient experience to enable him to speak authoritatively upon this subject, and such extremes of experience have been reported that it is difficult to estimate the real dangers and difficulties of prostatectomy. Dr. Goodfellow, in a paper upon " Perineal Prostatectomy," read before the California Academy of Medicine, April 29, 1902, says, " We can confidently say to sufferers from the troubles incident to hypertrophied prostate that a cure is absolutely certain, the danger practically nil." On the other hand, Dr. Chetwood, in the *Medical News* of August 8, 1903, says, " No thoughtful surgeon will declare that the mortality rate of prostatectomy is trivial."

Prostatectomy, involving as it does such important anatomical structures and being performed as it often must be under such adverse conditions, is a capital operation, and no capital operation is without a death-rate, serious complications, and sequels. With our improved technique the mortality is not high, the complications and sequels are constantly growing fewer, but they must necessarily exist, and it is only by faithfully noting and reporting them that we can hope to reduce them to the minimum. It is altogether too grave an operation to be resorted to as a routine treatment for every enlarged prostate, and is applicable only to properly selected cases. There will always be a place for palliative measures in neglected cases of prostatic enlargement.

It is not wise to say that after a certain age a man is not a fit subject for this operation, because the number of years he has lived is not a proper index to his surgical age. As long as a man's heart, arteries, and kidneys are in fit condition to

allow the administration of an anæsthetic, he is a fit subject for
surgery.

The most frequent cause of death following this operation
is uræmia, consequently the most important preliminary ex-
aminations are those of the kidneys. Unfortunately, the en-
larged prostate and inflamed bladder make it a difficult matter
to ascertain the exact condition of the kidneys, but after the
usual microscopic and chemical examination of the urine made
by a competent person, we are warranted in operating so long
as there is no positive evidence of serious kidney involvement.
In the presence of such evidence, the operation is contra-
indicated, and we must be content under these conditions to
resort to palliative measures only. The modern practice of
administering water and urotropine freely for a few days pre-
ceding and following operation undoubtedly carries some pa-
tients from the border-line to the safe side.

The next greatest danger is sepsis, and in the presence of
an infected bladder it is an ever-present one. These old men
will bear up under an operation almost as well as younger ones
so long as wound infection does not take place, but they have
very much less resisting power against sepsis. It is impossible
to disinfect a thickened, badly infected bladder before operation,
so our only hope lies in thoroughly cleansing the wound and
providing for free drainage.

The complicating cystitis is often at the present time the
most positive indication for operation; and it is for the relief
of this complication that the various palliative measures are
most frequently employed. Our only means of preventing
cystitis as a complication is to get prostatectomy so well estab-
lished that it will be the accepted method of treatment when
catheter life would otherwise begin. The only satisfactory
treatment for this complication is drainage, and this is best
brought about by perineal prostatectomy.

Stone is a frequent complication of enlarged prostate and
should always be sought for and removed during the operation.
Cases are on record in which a stone has been overlooked, and
as a consequence the operation was a failure. This might very

readily happen in the perineal operation unless the operator made a deliberate search for stone.

The incision for a prostatectomy when too extensive causes various complications. In the upper operation it may injure the peritoneum, and in the lower one important muscles, blood-vessels, and nerves are unnecessarily injured by an extensive cut. The peritoneum is ordinarily easy to avoid, but with a contracted bladder the danger of injury to this membrane is great. In the perineal operation the tendency is to employ the straight median incision, because it certainly does the least injury, and because those who have employed it find that a more extensive incision is unnecessary. On the contrary, those who have employed the larger incisions have learned that they are not necessary, and that they do cause unnecessary complications. Beginners are prone to cut too much, because they think it makes the operation easier, and because they have not been properly warned against the complications arising therefrom.

Hæmorrhage is an occasional complication, but its dangers have doubtless been over-estimated. The writer has had no serious hæmorrhage complicating the perineal operation, but has had some anxious hours from this trouble in the suprapubic operation. The median perineal incision certainly reduces this danger to the minimum. It is always better to control the hæmorrhage by ligature or forcipressure when practical rather than resort to packing, for packing firm enough to control the hæmorrhage causes severe pain and may cause sloughing.

Too little effort is made to protect the urethra in the perineal operation. It simplifies the operation wonderfully to sacrifice the whole prostatic urethra, as is frequently done; and it is marvellous how quickly nature compensates for its loss; but it is not reasonable to expect that there will not be traumatic stricture later. We all know what a serious matter a traumatism to other portions of the urethra often proves to be, and there is no reason why the same will not prove true of this part. Within the next few years we will all see patients suffering

from this cause who are now listed among the cured. This operation is a mutilating one at best, and it is our duty to be as conservative as possible. The destruction of a certain part of the lower wall of the urethra is unavoidable, but the upper and side walls can and should be preserved. We must not try to develop a grand-stand operation which yields brilliant results for a time only to be followed by disappointment later, but rather a conservative operation, which cures so that the patient can live out his expectancy in comfort. A man with a traumatic stricture at the neck of his bladder may be in a worse condition than one with an enlarged prostate.

One of the serious objections to the suprapubic operation is the extensive injury done to the bladder. With proper care, extensive injury to this organ can be avoided in the perineal operation. The writer has repeatedly demonstrated on the living and the dead subject that in a case suitable to this operation the gland can be enucleated without serious injury to the bladder. The muscular fibres of the bladder are continuous with those of the gland, but there is always a distinct layer of bladder fibres which are independent and to the inner side of the gland. Over the third lobe it is often quite thin and requires great care for its preservation. When the bladder is torn, the wound should be closed with catgut.

The most difficult problem in the perineal operation is how to avoid injury to the rectum. There are very few, if any, operators who have never met with this accident. It is not a disastrous event when it does happen, but is always a serious complication. The rectum may be torn through, or it may be so injured that it will slough through after a few days. In order to avoid this accident, it is necessary to follow the urethra closely back to the apex of the gland, then open and keep well within the capsule. None but an experienced and trustworthy assistant should be allowed to hold the retractor on the rectal side, for it is a very easy matter to push the instrument through the bowel. When the accident does occur, the opening should be closed with stitches to the rectal side backed up by catgut on the perineal side. When the opening is small, a purse-string will suffice.

Can we preserve the seminal ducts? It is certain that with our present technique we do not preserve them, and in the case of a virile man this is surely a very grave complication. As this operation becomes better established, we will operate earlier and necessarily upon younger men, when this will become a serious question. Young, of Baltimore, has reported to the American Association of Genito-Urinary Surgeons a technique by which he claims to be able to preserve these ducts, and this is certainly a necessary step if we hope to establish the early operation for prostatic enlargement.

For a comparatively young man impotence is certainly the most serious sequel of prostatectomy, and one to which we must give careful consideration. With our present technique which destroys the ducts, it is doubtful if any man has the power of procreation after a prostatectomy, and some lose the power of copulation. The prostate is undoubtedly a generative organ, but whether it is an indispensable one, remains to be demonstrated. It seems rational to believe that interference with blood and nerve supply by a too liberal perineal incision may be a cause of impotence. This possibility certainly affords food for reflection.

An occasional sequel of prostatectomy is incontinence or dribbling. This is due either to injury to muscles or nerves or to the neck of the bladder, most frequently the latter. This condition should rarely obtain, because by proper care and conservatism it can be avoided. A careless or inexperienced operator may very easily tear away that portion of the sphincter of the bladder just below the urethra and in front of the third lobe, which would be very liable to be followed by incontinence.

The perineal wound is usually closed inside of three weeks, but a perineal fistula will occasionally remain. This may be caused by too protracted draining. It is rarely necessary to leave a tube in the bladder for more than a week, and it may often be removed earlier to advantage. This delay in the closure of the wound may be due to the fact that the operator did not properly close the cavity left by the removal of the gland. The lateral walls should be carefully approximated by

buried catgut sutures, as we do in operations upon the female perineum, so that there remains but a channel for the drainage tube to pass from the bladder to the outside. Later, when we learn to operate upon prostates before the bladders are infected, we may be able to close the perineal wound completely, draining through the urethra only. It is a mistake to fill a large space in the perineum with gauze, because it delays union and leads to complications and sequels. When a fistula shows a tendency to become chronic, it can be cured by a plastic operation followed by a catheter in the bladder for a few days.

A communication between the urethra and the rectum is one of the sequels met with occasionally. The writer operated upon one such case successfully by dissecting up through the perineum, closing the openings in the urethra and bowel with fine chromic gut, and leaving a gauze drain between these two points extending out through the perineum. By leaving the gauze between the two points repaired, it was hoped that if one fistula failed to close at once, the other might heal; and this was just what did happen, nature finally completing the cure without further assistance.

Epididymitis is quite a common sequel of prostatectomy, sometimes becoming so troublesome as to require the removal of the epididymis. It may be caused or aggravated by the injudicious use of sounds, and should always be remembered as a possibility when they are employed.

Because the writer has dealt briefly upon possible as well as probable complications and sequels of prostatectomy, he does not wish to be classed a pessimist. The true optimist is one who recognizes difficulties with the hope of overcoming them. In order to place this operation on a proper footing, it is necessary to recognize the fact that it is not the bed of roses some of our over-enthusiastic brethren who have operated upon a few cases successfully would have us believe. Some failures are bound to follow this important operation, as they do every operation of like magnitude; but, notwithstanding this fact, it is destined to be one of the greatest boons modern surgery has to offer suffering mankind.

A CASE OF ENORMOUS PROSTATIC CALCULUS.[1]

SECONDARY TO TRAUMATIC STRICTURE OF THE PERINEAL URETHRA; SUPPU-
RATION ABOUT THE STONE; SECONDARY ABSCESS IN THE PELVIS; EX-
TENSIVE URETHRORECTAL FISTULA FOLLOWING PERINEAL SECTION FOR THE
CALCULUS; PERINEAL RECTOPLASTY FOR THE CLOSURE OF THE FISTULA;
RECOVERY.

BY G. FRANK LYDSTON, M.D.,

OF CHICAGO,

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the Illinois State University; Surgeon to St. Mary's and Samaritan Hospitals.

M. B., farmer, aged thirty-four years, referred to me by Dr.
V. H. Ruble, of Pierre, South Dakota, first consulted me on the
15th of June, 1900. His history was as follows:

He had been perfectly well until four years previously, when
his horse fell upon him, producing various injuries, the most
severe of which was apparently a blow upon the perineum. This
was followed by hæmaturia for one week. There was no urinary
obstruction nor retention, and he was apparently as well as before
the accident within ten days after its occurrence. He remained
well for six months, at the end of which time he noticed difficulty
in micturition. The stream diminished in size with frequent de-
sire to micturate. This condition increased steadily. One year
before consulting me he passed several small calculi. He has
passed calculi at intervals ever since. At the time he first con-
sulted me the stream of urine was very small; there was consider-
able difficulty in evacuating the bladder, and he was having occa-
sional chills, especially if the urethra was interfered with by
instruments.

On examination I found a hard, callous stricture in the bulbo-
membranous region, with secondary cystitis. This was permeable
to No. 20 Charriere. Perineal section was advised and consented
to. The operation was, however, deferred for a few days at the
patient's request, preparatory treatment being meanwhile insti-
tuted. The patient chanced to come in contact with some physi-
cian, by whom he was dissuaded from submitting to the operation,

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being told that he could be cured by medicine. I afterwards was informed by Dr. Ruble that his patient had returned home after an alleged cure.

November 28, 1901, the patient returned to me for examination. I found at this time a large tumor in the prostate, distinctly jutting into the rectum. This was of stony hardness and absolutely immobile. I made a diagnosis of secondary calculus embedded in the prostate. The patient could still micturate, and the urethra was, as before, permeable to No. 20 French. The stone could not be felt by urethral exploration. Operation was again proposed, it being my intention to perform a suprapubic section as well as a perineal urethrotomy. The patient again consented, but delayed submitting himself to the knife on one pretext or another for some days, during which he fell under the spell of several gentlemen who, like his previous surreptitious consultants, informed him that the diagnosis of his case was wrong, and that he could be cured by remedies. The most I could do with him before he escaped from my supervision was to secure a skiagraph of the stone, which is presented herewith (Fig. 1). Having been again cured by medicines, the patient returned to his home in Dakota, and I did not hear from him again until the 12th of October, when he was brought into my office by Dr. Ruble, who gave the following interesting history:

In May last, suppuration occurred about the calculus and a secondary abscess formed in the pelvis, I infer from infection of the pelvic lymphatic glands. This was evacuated at the external inguinal ring, it having pointed through the inguinal canal on the right side. More than a pint of pus was evacuated and the abscess promptly healed. Dr. Ruble considered it expedient to remove the calculus from the prostate by way of the perineum. For a time afterwards the patient did apparently well, and for some weeks was passing his urine *per vias naturales*.

Some time after the perineal section, it was noticed that a pouch containing fluid had formed in the perineum. Dr. Ruble opened this pouch, evacuating a quantity of pus and decomposed urine. The cavity not only did not heal, but thereafter the fæces and urine were discharged through the perineal opening and also appeared at the meatus. Urination subsequently took place entirely by way of the perineum.

When I examined the patient on the 12th of October, I found

Left Side.

Right Side.

Fig. 1.—Skiagraph of prostatic calculus.

a large pouch in the perineum communicating with the perineal wound; this was lined by pseudomembrane, and at its posterior extremity connected with the urethra. The perineal portion of the urethra was the site of a firm, callous stricture which extended from the middle of the perineum back to the bulbomembranous junction. It had been impossible to pass the sound into the bladder since the last perineal operation. I did not, however, attempt to pass an instrument at this time. Fæces and urine were discharging freely through the perineal wound and fæces appearing at the meatus. On rectal exploration, I found a fistula in the anterior wall of the rectum, approximately two inches in length and half an inch in width. On inquiry, I found that an attempt at a plastic operation from the rectal aspect of the fistula had been attempted. This is important only as explaining to a certain extent the loss of tissue, the greater portion of which, however, had been lost by sloughing or ulceration after the perineal operation for the calculus.

I proposed operation for the relief of the stricture and repair of the rectum.

Operation.—The operation was performed the following morning. I made the ordinary Y incision in the perineum, so extensively used for prostatectomy. The urethra and rectum were separated to a point about one inch above the upper angle of the fistula. This point corresponded very nearly with the prostatovesical junction. The dissection was accomplished with considerable difficulty, the urethra and bowel being fused together firmly by cicatricial tissue. When the separation was effected, three good sized pockets were found about the neck of the bladder, representing the pouch formed by the pressure of the calculus and the results of the destruction of the prostate and its environs by suppuration. Great difficulty was experienced in repairing the fistula in the rectum. The operation was very tedious, but I finally succeeded in closing the rent in the bowel with three superimposed lines of chromicized catgut. The two lines of suture first inserted were made continuous; the final line of suture was the ordinary Lembert. Especial effort was made in repairing the opening of the bowel to get as large a surface of denuded tissue as possible. When the suturing was completed, a considerable buttress of freshened tissue covered the opening in the bowel. A fortunate circumstance of the suturing was the fact that the

fistula was drawn to the right of the median line, thus lessening the chances of a re-establishment of continuity between the urethra and bowel. In future operations of the kind, I shall make the attempt to displace the line of suture laterally, as a systematic procedure. The callous stricture in the perineum was cut away, leaving merely a strip of mucous membrane on the roof of the canal. When this portion of the operation was completed, the floor of the urethra was entirely gone from the middle of the perineum to the prostatovesical junction, the internal sphincter vesicæ being alone intact. No attempt was made to close the urethra by a plastic procedure. The sphincter ani having been thoroughly dilated at the beginning of the operation, a large tube, wound with iodoform gauze, was inserted into the bowel to protect the repaired area from disturbance by gas and fæces. The operation was completed by packing thoroughly with iodoform gauze the extensive cavity which now occupied the perineal body as far as the orifice of the bladder. A catheter was retained for twenty-four hours, after which time no attempt was made to divert the urine from the track of the wound. It was found that, subsequent to the removal of the catheter, the packing in the perineum was so effective that the urine in great part began to flow through the normal channel. The first strips of gauze which were introduced into the wound were so closely applied to the line of union of the fistula as to protect it completely from such portion of the urine as might escape *via* the perineum.

The patient's present condition is apparently extremely satisfactory. The perineal wound is almost completely closed, and the urine escapes almost entirely by the normal channel. The rectal fistula is almost entirely closed. No fæces have escaped at any time into the perineal wound. There is, however, an occasional escape of gas. This escapes slowly and in very small quantities, indicating that the opening in the bowel which still remains is very small. No urine escapes by the rectum, as was the case prior to operation. Rectal examination with the finger fails to detect any solution of continuity in the bowel; whereas, prior to the operation, the finger readily passed from the interior of the bowel through the fistula, and as far as the length of the finger would permit, into the perineum anteriorly and into the various pockets about the neck of the bladder hitherto described posteriorly. Proctoscopic exploration fails to find the fistulous open-

ing. It will thus be seen that primary union of the fistula was almost complete. I have little doubt that the result will be entirely satisfactory. Complete closure is probable. Should a small opening persist between the bowel and urethra, it will quite likely close under cauterization from within the bowel, as has occurred in several cases of a similar character coming under my observation.

The calculus (Fig. 2) removed in this case weighs 720 grains. I have not made a section of it, so I am not prepared to state what

FIG. 2.
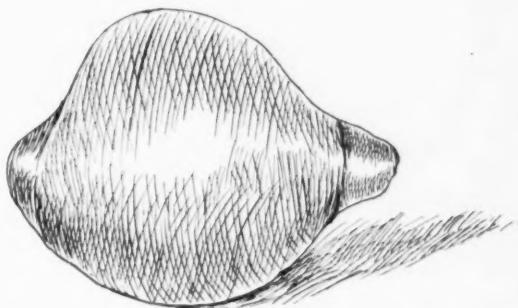
Prostatic calculus.

is the composition of its nucleus. The rationale of its formation is, I think, as follows: As a consequence of the traumatic stricture of the urethra, a certain quantity of residual urine continually remained in the canal. Decomposition followed, with the formation of secondary calculi. The obstruction to the outflow of urine meanwhile caused dilatation of the prostatic ducts. As the outflowing stream of urine during micturition came in contact with the obstruction afforded by the traumatic stricture, these small secondary calculi were forced against the latter and returned in the periphery of the stream. One of these calculi becoming lodged in a dilated prostatic duct formed a nucleus around which laminæ of phosphatic deposit occurred. This produced a rapid growth of the calculus, which growth continued until it attained the size shown in the specimen. It is, of course, possible that the stone formed in the prostatic utricle.

FIBROMATA OF THE TUNICA VAGINALIS.[1]

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THE case which forms the basis of this communication is as follows:

C. D., colored, male, sixteen years of age, and a farmer by occupation, entered the Freedmen's Hospital, December 9, 1902. He gave the following history: Was born and has always lived in the country. Father living and healthy. Mother died in 1890, the cause of death being unknown. Eleven brothers and seven sisters living and healthy. Two sisters dead of unknown causes. Patient himself has always been healthy, having escaped even the usual diseases of childhood. Does not use alcohol. When questioned as to his venereal history, he at first stated that in 1884 he had a yellowish discharge from the penis, followed by an abscess in right groin, which statement he afterwards denied. When it is considered that at that time he would have been but eight years old, it is probable that the discharge, if indeed he had one, was not gonorrhœal. No history of any injury to scrotum. The present trouble began over eight years ago. First appeared as a swelling in the upper part of right side of the scrotum, which has continued to enlarge ever since. The growth has been painless. There has never been any enlargement of the scrotum except that caused by the growths. The only inconvenience suffered has been that incident to the size of the growths and some pain after heavy lifting or over-exertion.

Examination shows a greatly enlarged scrotum, reaching nearly to the knees. It is somewhat pyriform in shape, with the apex below. Skin of scrotum shiny from stretching, but otherwise normal. Veins of scrotum prominent. Right testicle felt at a point twenty centimetres (eight inches) below external inguinal ring and is normal in size, shape, and consistence. The

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[1] Read before the Southern Surgical and Gynæcological Association, December 17, 1903.

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cord can be traced to the external ring. Left testicle ten centi-
metres (four inches) below external ring and feels normal in
every way. The scrotum is not tense and does not contain fluid.
The tissues of the scrotum have a flabby, gelatinous feel, which
is peculiar. Three separate masses can be felt in the right side
of the scrotum. One is high up, near external ring; the others
lying diagonally from it downward and to the left. All are freely
movable. No point of attachment can be made out, either to
the testicle, cord, or walls of the scrotum. The upper mass is
smooth and even; the other two are lobulated. The lower growth
feels somewhat larger than the others. All are hard and dense
to the feel. Owing to his conflicting statements as to a urethral
discharge, with abscess, the groins were carefully searched for
old scars, with an absolutely negative result. A keloid was found
behind the right ear, the result of an old cut in that situation,
six centimetres (two and one-half inches) long. Thoracic and
abdominal viscera normal.

The diagnosis was fibroid growths in the tunica vaginalis.
This was based partly on the history of a slow, painless growth;
the absence of any glandular involvement and the freedom of
the patient from cachexia of any kind. These points, with the
absence of ulceration or fistula, served to exclude tuberculosis,
syphilis, and malignant disease, while the hard, dense, lobulated
feel of the growths, together with the presence of keloid, indicated
a positive diagnosis of fibroma.

Operation, December 15, 1902.—Incision in right side of scro-
tum down to the growths. The tunica vaginalis was greatly en-
larged and thickened and was converted into a gelatinous mass.
The upper tumor ran into the inguinal canal and was attached
there by a pedicle. For the other two no distinct points of attach-
ment could be made out. They seemed to be embedded in the
thickened tissues of the tunic. All the growths were enucleated
without difficulty. In dissecting out the gelatinous tunica, the cord
on the right side was cut accidentally, and, together with the tes-
ticle on that side, was removed. This accident was deplored at
the time, but, in view of the report of the pathologist, it is per-
haps as well that these structures were removed. The excess of
skin in the scrotum was cut away and the wound closed without
drainage. Healing was aseptic and uneventful. The largest
growth measured thirteen by eight centimetres (five by three

inches), and the other two, ten by six centimetres (four by two and one-half inches). The weight of the entire mass, tumors and tunic, was 1644 grammes (fifty-eight ounces). The tumors alone weighed 1077 grammes (thirty-eight ounces) and the tunica 567 grammes (twenty ounces). (See Fig.)

I have recently heard from the boy to the effect that he was in perfect health and strength.

The report of the pathologist was that the main structure of the tumors was fibrous tissue. At many points throughout the masses were areas of myxomatous and fatty degeneration. The tunica vaginalis was myxomatous throughout. The testicle also showed areas of myxomatous degeneration. He classed the tumors as soft fibromata undergoing degeneration.

In considering these unusual growths, it must be accepted, I think, that they are essentially fibrous in character, and that the fatty and myxomatous areas are but expressions of the degenerations which fibrous growths anywhere are liable to undergo. This association of fibroma with myxoma and lipoma has been noted in fibrous growths in various situations, and is a well-recognized pathologic fact.

As to the etiology of these tumors, it is probable that, in spite of the absence of any such history, there must have been some injury or irritation which acted as a starting-point. The vague history of a urethral discharge may explain this. It is notoriously difficult in people of his race to get anything like a connected or reliable history. It is hard to conceive of the spontaneous origin of growths like these from the tunica vaginalis. Another factor of some importance is the existence of the keloid in this case. This may reasonably be interpreted as showing a tendency to fibromatosis in this individual.

The writer has elsewhere [1] called attention to fibroid degeneration as a peculiarity of the negro race, and offers this case as a confirmation of the theory there advanced.

It may be of advantage for purposes of comparison to consider for a moment the occurrence of fibrous growths in some of the other serous cavities. Fibromata have been found in the pleura, the peritoneum, the pericardium, and the joint
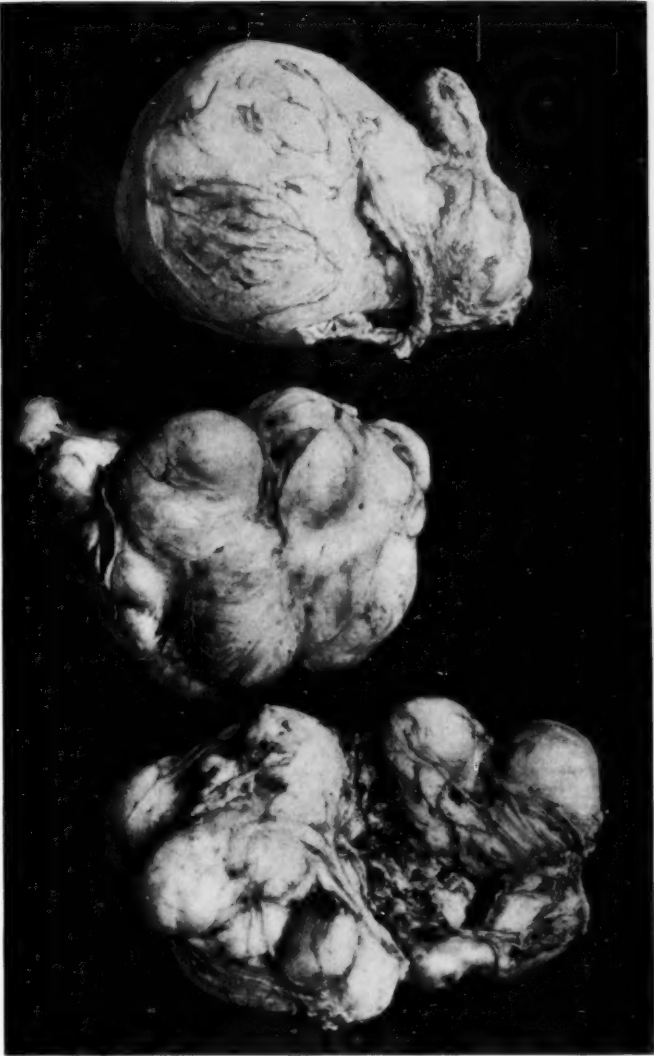
Fibromata of the tunica vaginalis.
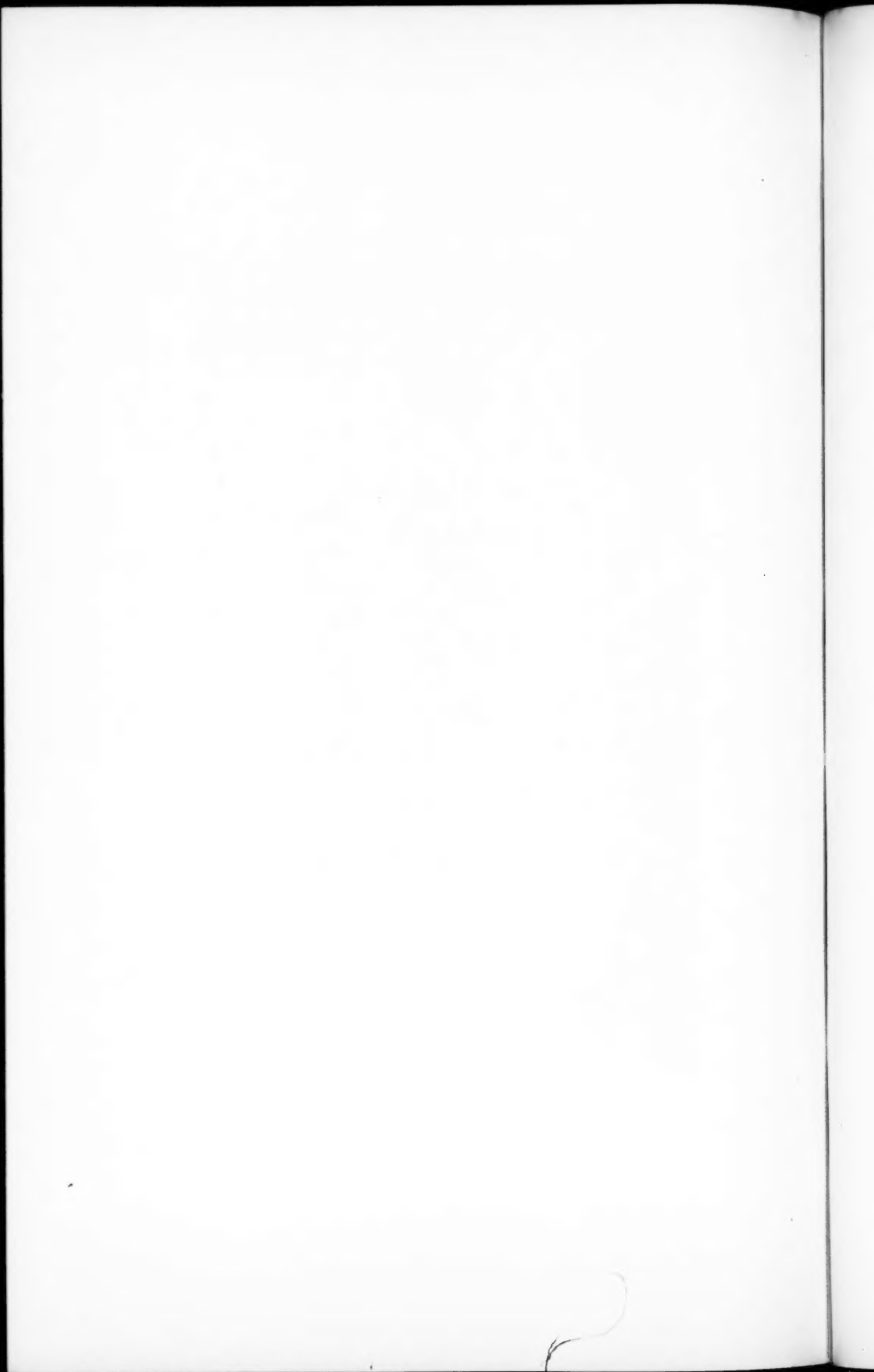
cavities. In the pleura and peritoneum these growths have been found loose. It has been supposed that they existed first as fibrous elevations on the surface of the membrane, originating in the subserous connective tissue; then became pedunculated, and, finally, by the constriction and severance of the pedicles, became loose, floating bodies.

Myxomatous peritonitis, while rare, does exist and gives rise to masses of gelatinous, straw-colored material, which may be scooped out of the cavity and may be mixed with fibrin. This is secreted by the peritoneal endothelium and is generally secondary.

That some such course of events must have occurred in this case seems likely, owing to the extensive myxomatous degeneration of the tunica vaginalis. The entire membrane was converted into a gelatinous mass, resembling the Whartonian jelly of the umbilical cord. This, however, does not explain the like degeneration in the testicle. From the limited areas of degeneration, it is reasonable to assume that the disease in the testicle was secondary, and that it may have resulted by continuity.

A careful consideration of all the facts in this case would seem to indicate the following chain of events: An irritation of the tunica vaginalis, from an injury or a possible gonorrhœa, causing a myxomatous degeneration of that membrane. The consequent irritation of the subserous connective tissue resulted in the formation of fibrous nodules, which gradually became pedunculated, and finally, in the case of two of them, resulted in their becoming free in the cavity, the third being still attached to the membrane. The myxomatous degeneration of that part of the tunic overlying the testicle may have resulted in a similar degeneration in that organ.

A case reported by Curling [2] shows that this supposition is not improbable. Curling's patient was a man of twenty-four years, in whom the disease had existed for eighteen months. The cavity of the tunica was found to be distended by yellowish, morbid material, resembling fibroid matter, growing from the visceral surface of the tunic. It was lami-

nated in structure and of a fibroplastic appearance under the microscope. The external parts of the deposit were organized. Patches of a similar structure were found in the testicle, and the epididymis was infiltrated and destroyed.

Had this case gone on long enough, it is probable that a condition similar to that found in my case would have resulted.

A thorough examination of the literature on this subject shows that the case here reported is practically unique, but one other at all resembling it being found. There are several references to what, at first sight, seem to be similar growths, but which upon closer examination turn out to be essentially different in important particulars. Most of them are found to be cases of cartilaginous or calcareous degeneration of the tunic following syphilis or prolonged suppuration in the scrotum of the testicle.

The case referred to as resembling mine is that of Holmes.[3] His patient was a man of fifty-one years, who had had a tumor of the scrotum for thirty-three years. At the time that it came under Holmes's observation it was as large as a cocoanut; but it was stated that recently the growth had been more rapid, and that it had become more painful. At the operation it was found to be situated above the testicle and in front of the cord. It was removed and was found to be " solid, with soft spots." It was connected to the testicle by some areolar tissue, and was thought to spring from the tunica vaginalis. On section, it presented a grayish mass with glistening bands radiating in all directions. The centre was soft. Under the microscope it showed fibrous tissue, free nuclei, and oil globules.

In the same volume, Jessop[4] reports a case of tumor of the left side of the scrotum in a man of forty-nine years, which had existed for ten months and was the size of a child's head. The tunica contained fluid. The testicle is reported as " obscured," whatever that may mean. Microscopic examination showed areolar tissue. The tumor had grown rapidly, owing to an infiltration of albuminous fluid. Pathological report was to the effect that the elementary parts of the tumor belonged to

the connective-tissue group, the structure varying in different situations.   Some parts showed waxy-white connective-tissue network, enclosing fat cells.   The report closes by saying that the tumor showed characteristics of " lipoma, fibroma, and sarcoma."

It may be said of this case that the pathological report, like the testicle, is " obscured," but that, while very imperfectly reported, it resembles more nearly than anything else a sarcoma of the testicle.

E. Chambord,[5] in his thesis, " Étude sur l'anatomie et la pathologie de la tunica vaginale," which is an exhaustive study of the subject, makes no reference to fibrous tumors of the tunic, except the " floating bodies" that sometimes occur after hydrocele which has been treated by injections of iodine.

Tikhonovich [6] reports the case of a man of twenty-four years, who entered the hospital complaining of pain in left testicle.   Seven years before, while hewing wood, had struck left testicle with the handle of an axe.   Painless tumors soon appeared on the postero-external surface and had grown gradually to their present size.   On palpation, left testicle of normal consistency; larger than right.   On antero-interior surface are felt tumors, varying in size from a lentil seed to a large pea.   The tumors are movable in relation to both testicle and scrotum.   On upper part of testicle, where the epididymis is normally situated, is a tumor, size of a large hazel-nut, knotty, irregularly spherical.   It is movable and is sharply distinguished from testicle and scrotum.   Spermatic cord, which feels normal, runs into tumor.   Operation showed that the small tumors were in the tunica vaginalis, covering the epididymis and upper part of testicle, while the large tumor was separate.   As the vas deferens was involved with the smaller tumors, the testicle was removed.   Upon examination, two nodules, size of lentil seeds, were found in the testicle itself, in addition to those recognized before operation.   Microscopic examination showed fibrillar connective tissue running in bundles throughout the entire tumor, with spindle and round cells; the latter most marked along the course of the vessels.

Reclus [7] and Melchior [8] report cases of small, floating

bodies in the tunic following hydrocele treated by irritating injections. Quite recently, in operating on an old case of hydrocele, I myself dissected out a thickened tunic which was studded with small, fibrous nodules. In this case there was no history of previous treatment by injections. These cases, while hardly analogous to the one under discussion, are yet of interest as showing the importance of irritation as a factor in the production of these growths.

The following conclusions may be drawn:

1. That, like other serous cavities, the cavity of the tunica vaginalis may be the seat of fibrous growths.

2. That irritation is an important factor in their production.

3. That they spring originally from the subserous connective tissue, but may become detached and lie loose in the cavity.

4. That they are mostly of the variety known as soft fibroma.

5. That they are prone to myxomatous and fatty degenerations.

6. That the testicle may be affected by the same forms of degeneration.

7. That the growths are generally minute, the present case being unique both as to the number and the size of the tumors.

8. That excision is the only effectual remedy.

9. That, as the testicle is liable to be affected, the propriety of removing it with the growths should be considered.

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ON COSTAL AND THORACIC RESECTION FOR PYOTHORAX.[1]

WITH SPECIAL REFERENCE TO THE EXPLORATORY METHOD.

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At the Ninth Congress of Internal Medicine, Ziemssen and Ewald said, " Old cases of pyothorax should not exist; and when they did, the attending physician should be held responsible for their existence." This may be a rather severe verdict, still, in a way, it expresses the truth.

The histories of old pyothorax observed by me during a period of twenty-two years in New York City invariably reveal the fact that thorough evacuation of the pleural effusion was omitted at an early stage, that is, until after the expansion power of the lungs was materially impaired.

In the great majority of these cases aspiration therapy was continued for weeks before radical steps were taken. In some cases a simple incision had been made, in a smaller number procrastination went so far as to look for healing by the development of a so-called empyema necessitatis, and in a few cases surgical therapy was not considered at all because the pyothorax was supposed to be of a tuberculous nature.

It may safely be assumed that in all these cases, except those of tuberculosis, recovery could have been expected after timely and thorough evacuation, i.e., by primary rib resection. And while the prognosis of tuberculous pyothorax is grave, yet recovery took place in a number of cases treated by extensive thorax resection, as will be shown farther below. Similar principles apply to the treatment of pyothorax in which other

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[1] Paper read before the Surgical Section of the Academy of Medicine, December 4, 1903.

pathological conditions prevailed, like emphysema, for instance.
The presence of complications of this kind naturally delays the
healing process, even after early resection. There are several
cases of this kind on record. Under such circumstances, which
must be regarded as exceptional, early resection even of the
thorax wall may be indicated.

As a rule, the expansion power of the lungs can be esti-
mated at the time of the primary rib resection. If the case is
of long duration, if the history points to the presence of com-
plications, and if the diaphragm fails to rise and the pulmonal
pleura approaches the thoracic wall to a limited extent only,
the resection of a small piece of rib is insufficient, a multiple
resection being then imperative. And if the costal pleura ap-
pears to be fibrous, thoracic resection should be substituted for
simple costal resection. If the condition of the patient does not
permit of so extensive a procedure, the typical primary rib re-
section should be performed with a view to undertake the tho-
racic resection a week later, when the patient has become more
resistant.

Early primary rib resection is advisable for many reasons.
The main one is that it is unsurgical to treat abscess of the
pleural cavity on principles which differ from those governing
us in the treatment of other abscesses. Modern surgery treats
abscess cavities by free exposure and gauze packing. While
it is not denied that a cure can be effected by aspiration, espe-
cially if the effusion contains no solid elements, it remains a
hazardous procedure as long as the presence or absence of such
elements cannot be determined.

In 55 per cent. of my cases solid masses were found in the
abscess cavity. These could certainly not be aspirated. Now,
if any of our diagnostic means could enable us to know whether
such were or were not present, it might appear more justifiable
to recommend free opening only in cases where solid masses
are present, and to try aspiration when they were absent. But
as long as we possess no other means, mechanical or specula-
tive, to make this differentiation, save by making a free open-
ing, we have to choose the method which guarantees the

removal of the solid masses; and if a case which would have recovered by simple aspiration should undergo the more radical procedure of free opening, it will certainly get well just the same.

The simplicity of the aspiration technique is tempting. It is natural, therefore, that it finds its most enthusiastic advocates among the large contingent of the surgical amateurs who enjoy the prerogative that they never need the aid of a surgeon. They are generally the same who pride themselves with seeing all their cases of appendicitis recover " without being interfered with by the surgeon." When they aspirate, they draw as much pus as they can; the patient is then greatly relieved, and is so enthusiastic in praising this simplified treatment, that it would be simply impossible for a surgeon to persuade him to undergo such a " mutilating operation" as free opening. If the pus accumulates again, the patient gladly submits to a second and even to a third or fourth aspiration, because " a stab with a needle is no operation." But the solid masses in the pleural cavity cannot be withdrawn through the caliber of the aspirating needle, nor will they be absorbed. So the aspiration is repeated until much precious time is wasted, the patient becoming emaciated and the lungs contracted. Then, as a last resort, a free opening is made, which at this late stage often will not serve to prevent the fatal outcome. From this experience the aspiratory enthusiast concludes, of course, that free opening, particularly the resection treatment, yields a bad prognosis, as he, at least, " never saw a good result from it." These same operators would give up aspiration could they once see the solid masses in the pleural cavity. But unfortunately they never see an opened thoracic cavity, at least not at the early stage of pyothorax, and so they naturally conclude that such masses exist only in the imagination of some surgeons.

Aspiration should be reserved exclusively for exploratory purposes, for the cure of serothorax, and as a preliminary procedure where patients are extremely exhausted. In such cases, however, the apparatus of Bülau should be used.

As to the definition of serothorax, it may be said that such

effusions must be called serous which, although containing a small amount of pus cocci, still show the light color and the characteristic consistency; while pus represents a yellow, thick, homogeneous fluid. In practice, the differentiation should be made only macroscopically.

In 1879 Baelz advised the combination of aspiration with irrigation. The wish was the father of the thought, and it was certainly a splendid idea to try to wash out the solid particles from the pleural cavity. But these masses are unfortunately of too large size to be forced through the cannula of a trocar, so that this method, which was received with great enthusiasm, dropped into disuse.

The so-called Bülau's or suction method deserves attention. It is far superior to simple aspiration in that it aims to prevent refilling of the pus after aspiration. The technique of this method consists in introducing through the intercostal space a large trocar, from which the stylet is withdrawn, only the cannula remaining.

After a rubber drainage tube is pushed forward through the cannula into the pleural sac the cannula is removed. The tube, which must remain *in situ*, is then fastened to the skin with adhesive plaster and connected by a glass cannula with a long rubber tube. The rubber tube ends in a glass vessel filled with bichloride of mercury, where it is kept by attaching a piece of lead to its end. The glass vessel may be represented by a bottle, which the patient can carry around in his vest-pocket. The advocates of this method claim that a permanent evacuation proportional to the expansion of the lungs is thus achieved.

Brilliant as this method appears on a superficial contemplation, it has many and great disadvantages. First of all, the same objection as against simple aspiration must be raised, namely, that the solid masses cannot be removed by suction any better than by simple aspiration. Even the advocates of this method admit that the drain is oftentimes obstructed by fibrinous coagula. Fever is nearly always present on account of pus retention. It is but a small consolation that, by the introduction of instruments and frequent irrigations, this per-

petual obstruction can be removed, and that in the course of time the solid masses become liquefied.

Another very disagreeable feature of this method is that the drainage tube becomes loose in the wound-canal, which will finally suppurate, and then, of course, the seclusion from air is no longer hermetic. When the adhesive plaster becomes loose, the drainage tube is apt to fall into the cavity, and the only way to remove it is by free opening. I have seen a number of cases in which such accidents happened after Bülau's method was used.

It is furthermore to be remembered that all such patients require much more careful watching than those under radical treatment. In fact, the control must be so strict that it can be well carried out only in a hospital.

In cases where the intercostal space is narrower than usual, a small drainage tube can sometimes be introduced only with difficulty and after much annoyance to the patient; so the suction method should be reserved for very emaciated patients, and then used only as a temporary resort.

Simple incision through the intercostal space has still many advocates, for the reason that in the majority of cases it is un-doubtedly effective. It is also claimed that a small incision, which permits of the introduction of a small-sized drainage tube, fully answers the purpose of evacuation and of drainage, and that any general practitioner could make the incision; while resection is regarded as a difficult operation, which would require the well-trained skill of a specialist. Resection should be reserved, therefore, as a last resort only in cases where, after several months of unsuccessful treatment after the incision method, the ribs have approached each other to such a degree as to render the drainage imaginary.

Modern surgery, on the contrary, prescribes that the open-ing into an abscess cavity should be made as broad as possible. The cavity should be exposed to such an extent that it can be inspected thoroughly, that its walls can be palpated, and that its lining membrane as well as necrotic tissue (the latter often being present) can be removed. It is only after such rigorous

procedures that the surgeon is satisfied that the evacuation is thorough. The wound discharge will be scant, and will be taken up by the gauze introduced into the cavity. No retention is to be expected, and, as a natural sequence, a perfect and quick recovery may be looked for. It would not be expected that a surgeon should "lance" an abscess anywhere else, or introduce a drainage tube, the use of which would also imply the necessity of daily irrigations. And why should a pyothoracic cavity be treated on different principles from other abscesses?

Again, after simple incision the field of operation cannot be inspected at all. No method except resection enables the surgeon freely to introduce his finger, which procedure renders examination of the cavity possible and at the same time permits of thorough evacuation. Only if the intercostal space is very wide, which is never the case in children and seldom in adults, can the surgeon's finger be introduced; and if the opening permits of this, the finger is greatly restricted in its exploratory motions, and only small solid masses can be removed. Large masses will remain. Adherent clots cannot be detached from the pleura, nor can very large masses of them be reduced inside of the cavity, so as to make it possible to wash them out by a subsequent irrigation. So these masses have to undergo decomposition, retention of pus, of course, always being present, and are dissolved or liquefied under constant febrile elevations, when, at last, they may be washed out,— provided the patient holds out so long.

As regards the alleged difficulty of resection, the surgeon performs many an operation more difficult than that of rib resection. Interference with the intercostal artery happens much more frequently in simple incision than in resection, on account of the situation of the artery below the inner surface of the rib. In resection, the incision is made only as far as the periosteum. So far there are no vessels of any importance. Then the further procedures can be carried out with blunt instruments. The tissues in which the artery is embedded are pushed aside, so that it can be easily seen and avoided. If it chances to be severed during incision, resection must be done

at once; and in such case, if the operator is very nervous, the patient may bleed to death before it is completed. Fatal hæmorrhage from the intercostal artery after incision is reported from several clinics (Billroth). If, however, such an accident should happen after the resection of the rib, the artery can be readily caught. Often the ribs move together after simple incision. Then the further introduction even of a small drainage tube becomes impossible. This condition prevails in the majority of cases. In fact, it represents the omnipotent *vis medicatrix naturæ,* the effort of nature to diminish the extent of the cavity. But, unfortunately, the intended remedy in such cases is nothing less than a prevention of the cure, because it obstructs the opening.

So far there is no method which shows with any degree of probability before operation whether such fibrinous or cheesy masses are present. All we know is that the streptococcus has a predilection for solid masses. Yet in some of my own cases streptococci have been found where no solid masses were present. A large opening, which can be insured only by the performance of a resection, allows inspection and palpation of the cavity and represents the only means to diagnose the presence of the solid masses. So long as we can get no information about this most important point by other methods, resection should be preferred for this reason alone.

Even if performed late, in an emaciated patient who has been weakened under expectant treatment, whose lungs have lost their contractility after so long a period of compression, while the functions of the neighboring organs are impaired by the long duration of their displacement, resection will often still avert the fatal result. There are in fact no contraindications for rib resection in pyothorax, while in those unpardonable cases of long standing, where the patient has become weak and cyanotic, the pulse being small and frequent, a preliminary aspiration may be done for temporary relief, and resection on the following day or later.

In all cases of pyothorax, therefore, no matter how desperate they may sometimes appear, the resection of a piece of rib

should be performed.   Cures have been effected even in cases
when there seemed to be no gleam of hope.   Even when the
tarrying policy, " la médecine expectante," had caused amyloid
degeneration of the liver, ascites, etc., entire restoration to
health has sometimes followed the resection treatment.   Amy-
loid degeneration on this basis must not be regarded as a hope-
less condition, especially in children.

In tuberculous cases cures are reported by Schede, Gueter-
bock, Küster, Rydygier, Hofmokl, Th. Weber, Koranyi, and
myself, after very free rib resection.   In view of the absolute
hopelessness of tuberculous pyothorax, if left alone or treated
medically, even a much smaller percentage of cures, as re-
ported, would very positively indicate the resection treatment.
It would also be of great benefit if such patients were operated
upon much earlier, the chances being then much more favorable.

While primary miliary tuberculosis as well as pyothorax,
caused by the perforation of tuberculous cavity into the pleura,
gives a very poor prognosis, those cases in which the pleura has
been infected from tubercular lungs show a considerable per-
centage of cures.   Mixed infection is generally present in cases
of this variety, the pneumococcus, staphylococcus, and strep-
tococcus being also found.

While the tubercle bacillus was not found in the pyotho-
racic effusion of a considerable number of these cases, the
presence of tuberculosis could be well proven by other than bac-
teriological means of investigation.   In other words, the ab-
sence of the tubercle bacillus does not prove the absence of
tubercular disease.   So, as long as our diagnostic means in
this direction are not absolutely reliable, the surgeon will
always be on the safe side by operating upon every pus accu-
mulation in the pleural sac, whether tubercular or not.

In double tuberculous pyothorax, of course all radical
steps should be omitted.

The persistence of a thoracic cavity, whether it be simple,
complicated, or tuberculous, must necessarily lead to a fatal
end.   The better the patient is situated, the longer the inevi-
table outcome may be postponed, but this is only a question of

time. It is difficult to understand, therefore, why expectant treatment is still preferred to timely resection.

As said already, the pulmonal tissues as well as the thoracic parietes lose their elasticity. After a long continuance of the inflammatory irritation, the pleuræ become thickened and infiltrated, so that the costal pleura finally becomes so hard as to seem like an osseous coat-of-mail. At the same time the persistent and abundant suppuration causes amyloid degeneration.

In those exceptional cases where the lungs have not completely lost their elasticity, an effort may be made with the apparatus of Perthes, which permits of continuous aspiration. But, as a rule, the pulmonal pleura becomes immovable, the lungs fixed and inexpansible; while at the same time the chest wall does not show any tendency to collapse. To enforce this collapse of the chest wall has been the aim of the various operative procedures advised ever since Gustav Simon made the first suggestion of multiple rib resection. While the merit of Esthlander, whose name is generally identified with this method, should not be underestimated because he developed the principles of Simon, the latter is, as the record clearly shows, the father of the ingenious idea.

The practical advantages of the Simon method are small, however, as their indications are limited, for the reason that the pleuræ are left untouched. Even Küster and Esthlander, who extended the operation, did not recognize in the thickening of the pleura the main obstacle for the healing process. They maintained that the pleura should be a noli me tangere, and that the pleural wheals were useful and necessary for the formation of adhesion between the pleura. The genius of Schede recognized this fact on which the principle of resection of the thorax is based; in other words, that since the pleuræ represent a coat-of-mail as firm as osseous tissue, they must share the fate of the ribs, i.e., removal. Simon's original idea thus formed the stepping-stone for the more perfected method of Schede.

This principle is represented in practice by the exposure of the cavity through an incision reaching from the fourth rib,

running in a curve downward to the posterior axillary line on a
level with the tenth rib, and then up again in a curved direc-
tion on the medial side of the scapula.   In this way access is
gained to the largest cavities.

While the principle of Schede, as far as the removal of
the pleural tissue is concerned, must be held as irreproachable,
there are some objections to his technique.   First of all, the
fact must be considered that most of the cases of old pyo-
thorax do not need so severe a procedure; in other words, that
Schede's method reaches beyond the mark.   It is, in fact, in
its general execution one of the severest of operations; and it
offers no little danger to the patient who is already weakened
through prolonged debility.   It is also to be remembered that
it is performed not only by the skilful hands of its inventor,
but also by the average surgeon, and *si duo faciunt idem, non
est idem.*

As a matter of fact, modern surgery does not present a
suitable field for the development of typical operations.   Even
the fundamental principles of incision for amputation, sacred
for thousands of years, and formerly the *pièce de résistance* of
the old masters, have become shaky, the surgeon generally
adapting himself to the individuality of the case.   And if we
consider that old pyothoracic cavities show a many-sided pic-
ture which even the all-penetrating Röntgen rays cannot faith-
fully portray, it becomes evident that a typical method of resec-
tion is only advisable in a minor number of cases.   Of course,
we can measure the extent of the cavity by pouring in fluids,
and the Röntgen rays give us an inlook after the infusion of
iodoform glycerin which increases the shadows.   Skiagraphy
also proves uniform opacity in necrosed conditions of the
pleuræ, while fluoroscopy shows the mobility of the ribs con-
siderably interfered with.   But all these indications, while of
great academic interest, do not give the data for a detailed plan
of resection.

Probing is extremely uncertain, because the cavity is gen-
erally irregular; the fistulous tracts are generally twisted and
often of a meandering nature.   The probe thus being arrested
by projecting pseudomembranes, it is an altogether unreliable

indicator of the topography of the cavity. The consideration of
the deficiency of our exploration methods has led me to employ
methods of procedure which are intended to fit each individual
case; in other words, to perfect the plan of operation while
operating. A large exploratory incision should precede the
operation, the details of which will then be dictated by inspec-
tion and palpation.

Exploratory incision in diseases of the pleura was per-
formed by me with good results in June, 1894. (See "Ex-
ploratory Pleurotomy and Resection of Costal Pleura," *New
York Medical Journal*, June 15, 1895.) In the first case ob-
served by Dr. I. M. Rottenberg, of New York City, fibrous de-
generation had taken place on both sides of the pleura as a
consequence of a long-standing inflammatory process. Con-
siderable respiratory disturbances were caused, which could not
be explained satisfactorily. The exploratory resection of a rib
in the region of dulness, proceeding slowly and gradually, not
only discovered this condition, but also remedied it by remov-
ing the enormously thickened layers of the pulmonal pleura.

The experience gained in this case induced me to try the
principle of gradual and methodical procedure in cases of old
pyothorax, and with gratifying results, as described in an
essay on Pyothorax, in the *International Medical Magazine*,
January, 1897.

The *modus operandi* of this exploratory method consists
in resecting the rib which lies approximately in the middle of
the roof of the cavity, regardless of the pleural fistula, as illus-
trated by Case I, for instance. The fistula is utilized for the
passage of a sound, but during the operation itself it is avoided,
as in old cases osseous projections are formed around the fistu-
lous tract which make the direct method difficult (see Fig. 5),
most of them being more easily reached from the side. The
pleura underlying the resected rib is now incised. By means of
a lateral incision enough room is gained to inspect a large part
of the cavity and to palpate the cavity walls. The use of the
pleural speculum originally advised for primary resection is not
necessary in such cases (Fig. 1).

If the cavity is small and the patient is in a fairly good condition, which is exceptional, then the next two or three ribs are resected from the vertical incision in proportion to the extent of the cavity beneath, while the soft parts are held back with sharp retractors. The costal pleura is then excised by means of a blunt-pointed knife. If the fibrous tissue is very hard, then the lumen of the intercostal arteries is so much diminished by compression that the hæmorrhage can be regulated by temporary pressure. Then soft parts and ribs may be divided at the same time. Although this formation of wheals is to be most expected in very advanced cases, one should not rely too much upon such helps of nature, but make sure by means of a temporary prophylactic ligature en masse. This is carried out best by the aid of a large aneurism needle. In more extensive cases the ribs are divided successively in the same manner; the presumptive length of each piece is ascertained by palpation as it is incised. Palpation also tells whether the pleura below the ribs is still elastic or must also be sacrificed. The incision of the soft part proceeds likewise, which results in a very irregular looking flap. But no particular attention needs to be paid to the shaping of the latter, as it must depend more or less upon that of the cavity. Accordingly, cross-incisions may also be made. If a portion of the scapula is found to be in the way it is excised.

The muscular flap set free by the resection of the scapula can be utilized for the purpose of partially filling up the underlying cavity.

A mentionable point, to my knowledge not yet presented in literature and not of rare occurrence, is the concave arrangement of the lung surface which overbridges a certain amount of the cavity. The lateral parts of the pulmonary pleura succeed here to attach themselves to the costal pleura, fibrous adhesions holding them there. But the middle portion does not follow, and now it represents the floor of the cavity over which the approximated sides form the roof. The picture of this remarkable condition can be compared with that when one presses in the lung surface with the thumb so far that the sides of that segment of the lungs collapse in a ring around it. Then it re-

FIG. 1.—Pleural speculum in situ.
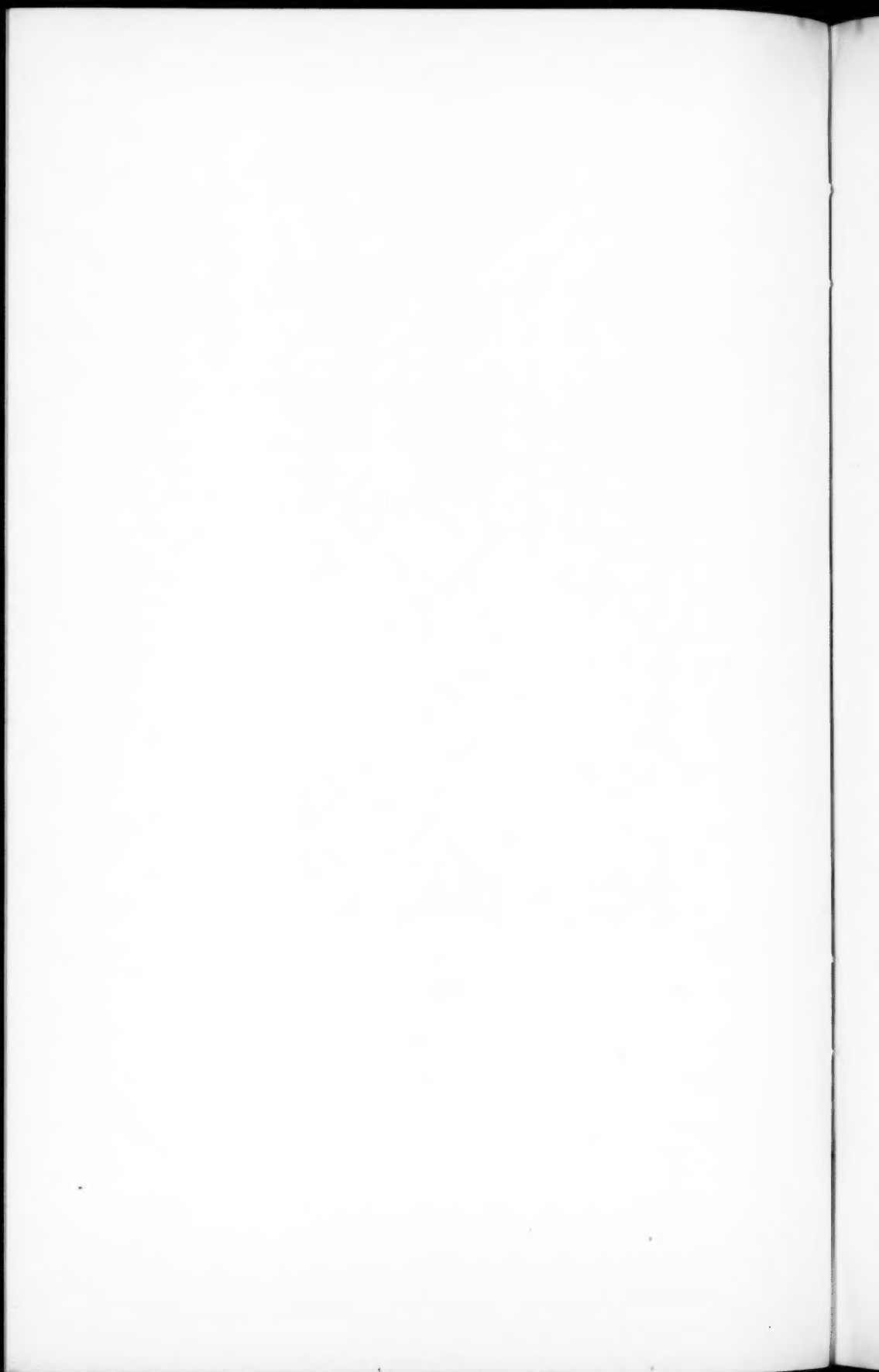
sembles the longitudinal fold formed of the gastric wall which is united in Witzel's gastrotomy over a tube, so that a canal is made of it.

Special caution is necessary at the beginning of the operation. If in a case of this kind we were to incise directly without first exploring the cavity thoroughly after the resection of the first rib, then we should injure the lungs. But if we have located the place of the thin portion where the pulmonary pleuræ join, then it is possible to finish the process by blunt dissection after having carefully divided the fibrous tissues. The lateral portions then gape apart and the circular cavity is transformed into a flat one. Partial decortication is indicated in such a case. It appears that the right half of the lung is particularly prone to this sort of adherence, due perhaps to the presence of the middle segment, which seems to have a desire to heal in the wrong direction.

The fact that the scapular region is the predominant seat of old cavities explains some of the technical difficulties incurred in the attempt to produce an artificial collapse of the chest wall. While in 21 per cent. of my cases the anterior, and in 8 per cent. the lateral, thoracic region was affected, the posterior area figures with 71 per cent. If it is considered that the posterior chest wall excels in firmness and rigidity, it will be understood that its collapse is produced with more difficulty than in front. Consequently, cavities show a much greater tendency to establish themselves there. It is evident that the artificial collapse can only be effected if all obstacles are removed; in other words, if the portion of the scapula which may prevent access to the underlying cavity is also eliminated.

Similar principles apply to the apex of the pleural cavity, which is not at all touched by Schede's procedure. Just as in the scapular region it is only the removal of the cavity roof which makes a cure possible. The vicinity of the subclavian vessels produces a risk of drawing the upper ribs into the field of operative measures. The following procedure has done me much service in the resection of that point of the costal dome which covers the pleural cavity. I would like to recommend it on account of its simplicity and comparative safety, and

because it can be performed to a limited as well as to a large extent, just as the individuality of the case demands it.

With the arm at right angles, the incision is led close to the lower border of the pectoralis major muscle in a horizontal direction till it ends at the lower part of the anterior margin of the deltoid muscle. The muscles are then dissected back superiorly until the axillary region is free. The vessels and muscles are grasped by strong blunt hooks and pulled upward. Sometimes separation is possible only by the aid of lateral incisions into both pectorales. Thus the vessels are temporarily put *hors de combat*, and the ribs can be removed according to the indicated principles. If it is very difficult to reach the first rib by means of the pectoro-axillary incision, then the clavicle is to be resected temporarily.

The decorticated flap is then trimmed and placed on the pulmonary surface of the pleura. If pieces of the pulmonary pleura have been removed, agglutination is much easier. In my aforementioned monograph (January, 1897) I laid particular stress upon the fact that the callous areas of the pulmonary pleura should also be removed. This is not easy in debilitated patients. But whenever possible, the operation should be finished in one séance, for a later supplementary operation always partly destroys the fruits of the first. Of course, in a case of doubt, we rather sacrifice them for the patient's safety.

This kind of decortication we gain by flat, saw-cutting incisions similar to the method of preparing microscopical sections. The principle is akin to that of the temporary resection, followed by decortication of the pulmonal pleura, as advised by Fowler and Delorme. But it is not practised methodically as advised by these authors, and only as the necessity arises after the exploratory section, and then as a supplement to the resection of the costal pleura.

Great credit is especially due to Fowler for the ingenuity of his procedure and " it would be a consummation devoutly to be wished" that the lungs would follow the wish of the operator. But clinical experience shows that it is only in a small series of cases that the lungs expand fully after the pulmonal pleura is mobilized. Therefore in most cases a resection of the

chest wall must be added to decortication of the pulmonal pleura.

Garré (XXVII Kongress der Deutschen Gesellschaft für Chirurgie, 1898) tried decortication repeatedly, but always with an unsatisfactory result. He also believes that the results of the procedures are entirely due to the interference on the chest wall.

As I see from a later publication, Jordan (*Beiträge zur klin. Chir.*, Band xxxiv) and Krause (the same, Band xxiv, v. 1) likewise report results from this combination.

For dividing the rib, I use an annular periostome (Fig. 2) and an elevatorium rib-shears (Fig. 3). The first is a sort of

FIG. 2.

aneurism needle, but flat, and formed to embrace the rib, as I might say. After the dissection of the periosteum it serves as a retractor. It is combined with an elevator. The shears can be taken apart, so that both halves can be applied separately as

FIG. 3.

in the obstetrical forceps. (The instruments are pictured in the *New York Medical Record*, May 19, 1894, and the modifications in the *Journal of Surgical Technology*, December, 1900.)

The same principle was obviously applicable to the treatment of lung abscess, and therefore I recommended the exploratory pleuro- and pneumotomy in cases in which other methods, especially aspiration, gave no results. (See, on the diagnosis and treatment of abscess of the lung, *New York*

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Medical Journal, August 28, 1897.) Later, Tuffier reached the same conclusion. Of course, the use of the Röntgen rays has facilitated the process of locating the abscess. But the carrying out of the operative plan will have to shape its course in ac-
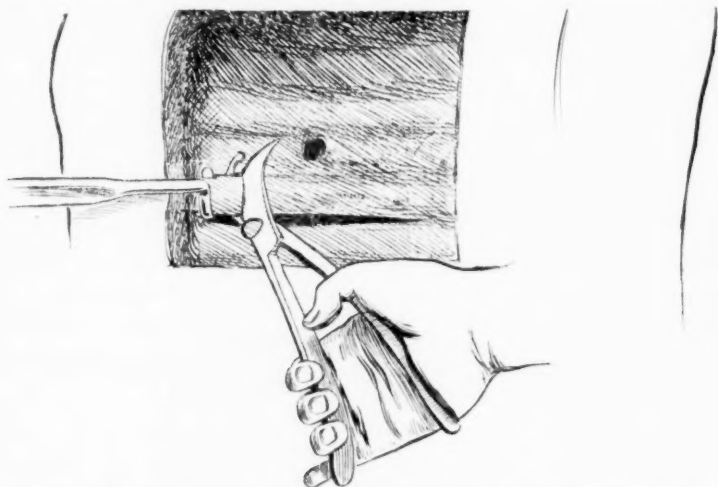

FIG. 4.—Annular periostome retracting soft tissues while the shears divide the rib.

cordance with the principles pointed out. The cavity is packed with iodoform gauze. Immediately after the operation this is done tightly, later on loosely. Then drainage tubes, enveloped by iodoform gauze, may also be used. Thus irrigations are not only rendered unnecessary, but are in fact harmful.

During the after-treatment stress is to be laid upon early gymnastics, which favor expansion of the lungs. To this end I recommend dumb-bells and practice on a bugle. The regeneration of the resected ribs is illustrated by the Röntgen rays (Fig. 5).

As illustrated in my previous essay (*International Medical Magazine,* January, 1897), the Röntgen rays offer splendid means of studying the various stages of bone proliferation after resection.

The photographs (Fig. 6) (*a*) represent the results of such processes, as, for instance, showing synostosis around the drainage tube so that a complete bony canal was formed; (*b*) shows synostosis without channel formation, and (*c*) illustrates
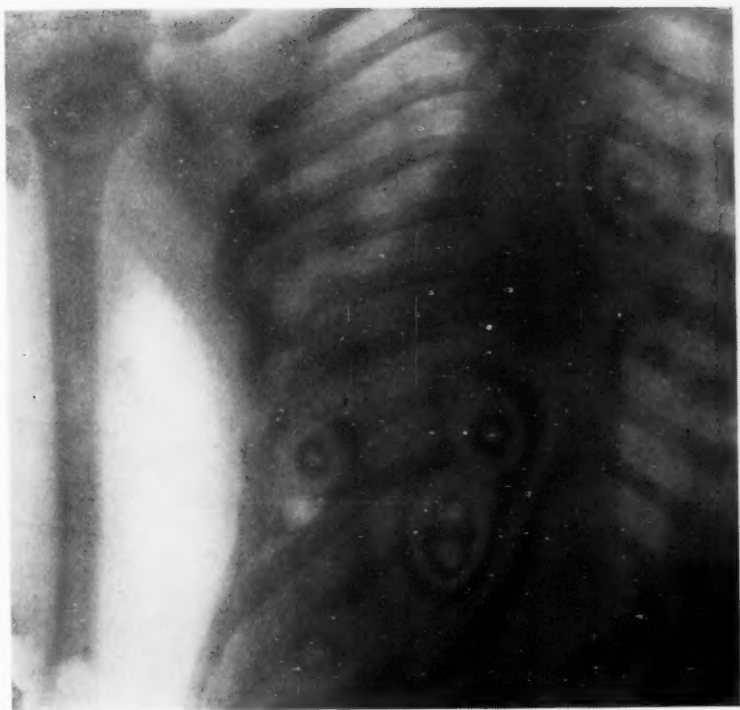
FIG. 5.—Regenerative process after resection of the fifth, sixth, seventh, and eighth ribs and of a portion of the scapula.
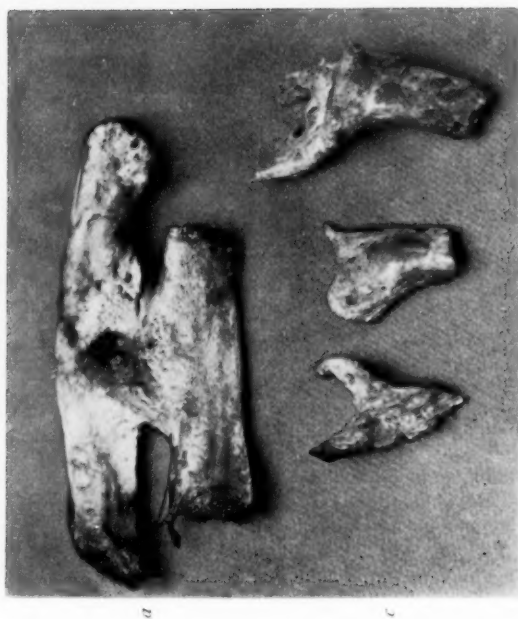
Fig. 6.—a, Synostosis around drainage tube; b, Synostosis without channel formation; c, Stalactite formations.
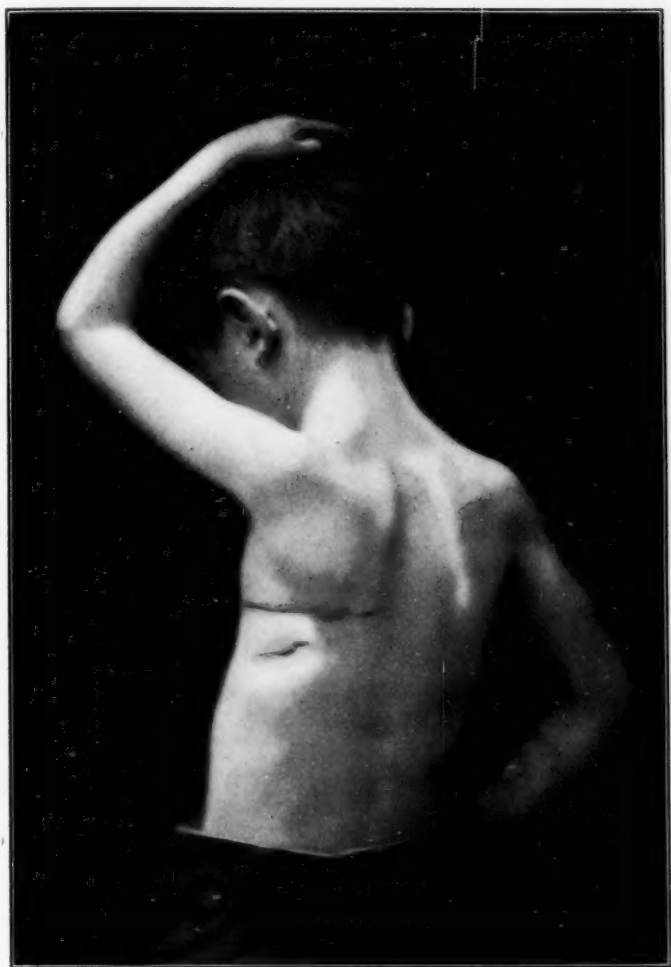
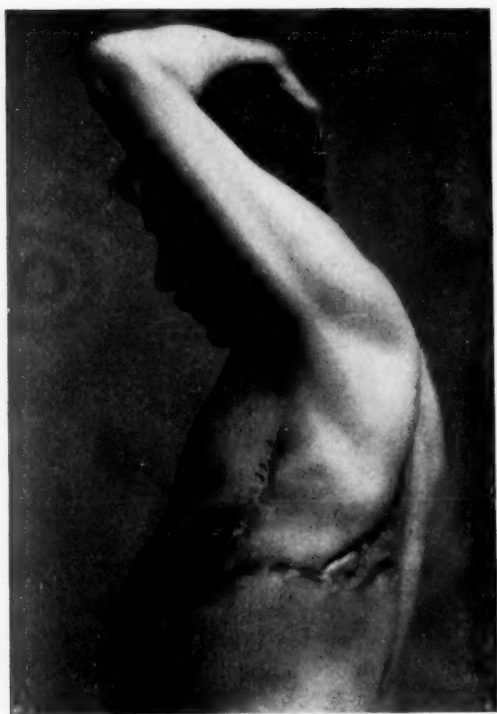FIG. 7.—Exploratory incision line above the fistula.

FIG. 8.—Result after Schede operation.

the stalactite-shaped formations obtained from old fragments. The skiagraph (Fig. 5) illustrates similar formations two months after resection.

The development of these irregular masses deserves close consideration. Their shape is apt to injure the pleura, which teaches the necessity of methodical exercise at an early period, that is, of forcible inspiration as long as the area in question is soft and yielding; in other words, there is deposition of calcareous matter in the regenerating bone tissue.

As to the inflammatory irritation as an induction to this abundant osseous formation as well as to the inflammatory atrophy causing translucency of the ribs, I may refer to " The pathologic and therapeutic aspects of the effects of the Röntgen rays, *Medical Record*, January 18, 1902."

Schede's advice as to the outlining of the skin-flap has been modified by Helferich, Sudeck, and Tietze. In suitable cases these modifications yield good results. But none of them can be utilized as a general method.

As an illustration of the views expressed, the following cases may serve:

CASE I represents a boy of six and one-half years, who, as reported, took sick with pleuropneumonia in March, 1900. In April an incision was made, which was followed by great improvement. A fistula, however, remaining, rib resection was performed in May, 1901. But the lungs did not expand, nor did the chest wall collapse farther, so that on October 2, 1902, I resorted to thoracic resection, the seventh rib being resected first. After free access was gained to the cavity, the remnants of the eighth rib, which surrounded the fistulous tract, were removed. Then followed the exsection of a large portion of the fifth and sixth ribs, as they were overlying the cavity, and the removal of the lower area of the scapula together with the respective pleural areas.

The hæmorrhage was very moderate. No stimulations were necessary, and recovery took place without reaction.

The skiagraph (Fig. 5), taken two months after operation, shows the extent of the resection as well as the proliferation of

the rib stumps. Although there is a deep depression left, more than a year after recovery, there is no curvature, so that practically no deformity exists (Fig. 7).

CASE II represents a man of forty years, who was seized with pleuropneumonia in November, 1899. Aspiration was tried first; later, the purulent effusion was discharged by the incision method. The thickened pleura demanded repeated rib resections, altogether four thoracotomies being undertaken. Schede's operation was finally performed two years ago (Fig. 8). But, although this was done in the most skilful manner, the cavity did not become obliterated, that is to say, the portion of the cavity which could be covered by the horse-shoe flap became considerably diminished in its extent. So the surgeon obtained as much benefit from the method as it was able to grant. But there still remained an immense cavity above that area. When I saw the emaciated patient for the first time, operative exploration in the upper thoracic region revealed the presence of a large and irregular cavity which extended as far as the first rib anteriorly and to the second in the dorsal region. The anterior area was exposed first, the fibrous tissue being extensively and atypically removed in order to get better access to the cavity, so that the wound treatment could be done more effectively. The patient improved soon afterwards, so that his condition permitted of a more severe interference. The upper four ribs were then exsected after access was obtained by the pectoro-axillary incision described above. This resulted in considerable collapse of the anterior chest wall, which was gradually followed by the obliteration of that portion of the cavity (Fig. 9). Nine months ago the removal of the posterior rib portion, together with the lower part of the scapula, was undertaken. The cavity has now gradually filled up, the only defect being that the axillary region is not yet covered by skin. The patient's general condition is excellent. There is, of course, marked deformity in proportion to the enormous collapse of the chest wall. But the patient's attitude is straight, nevertheless (Fig. 10). I attribute this to continuous exercise. The skiagraph (Fig. 11) shows the anterior aspect of the cavity after the first exploratory operation, while Fig. 12 shows the rib defect at the posterior aspect. It is noteworthy that the bones show the sign of inflammatory atrophy, due to the absorption of calcareous matter, as an expression of which the poor contrast between bony and soft tissues must be regarded.
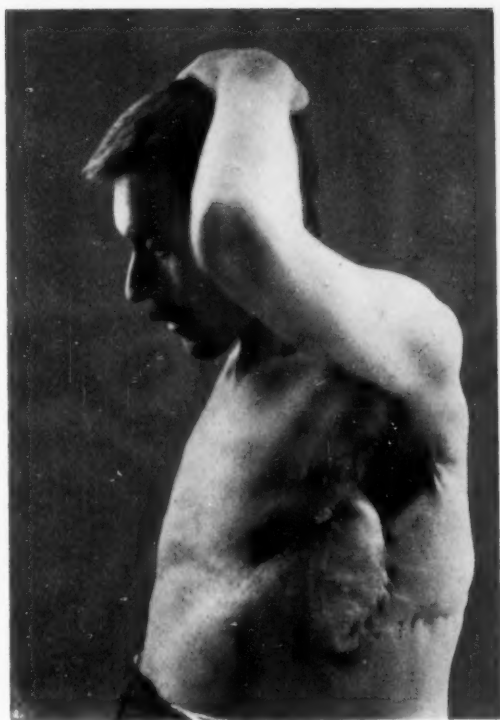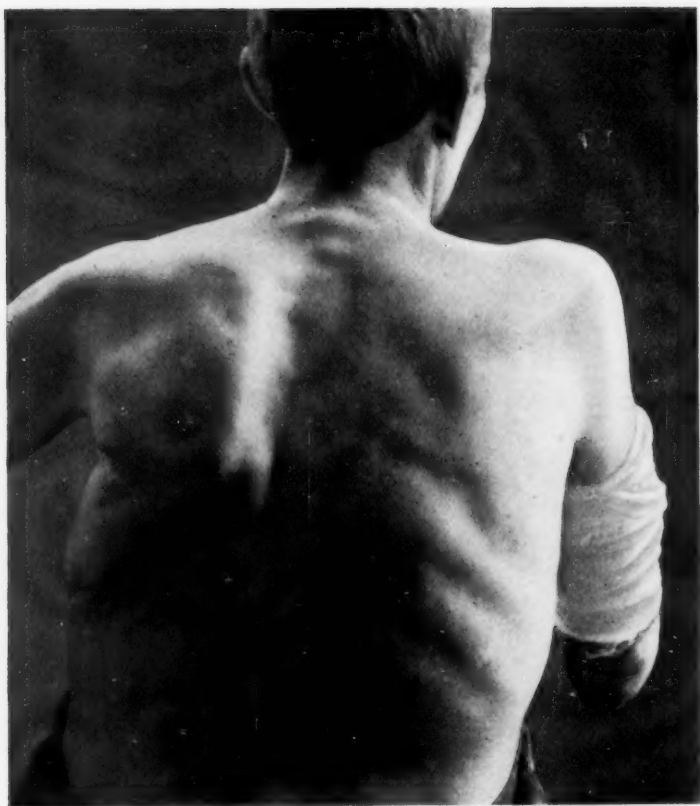
Fig. 9.—Result after superior thoracic resection.

FIG. 10.—Final result (note small size of left thorax).

FIG. 11.—Anterior aspect of cavity.

FIG. 12.—Posterior aspect of cavity.

THE TREATMENT OF PULSATING EXOPHTHALMOS.[1]

BY FRANCIS W. MURRAY, M.D.,

OF NEW YORK,

Surgeon to the New York Hospital.

THE disease known as pulsating exophthalmos is the result, in the vast majority of cases, of an arteriovenous aneurism of the internal carotid artery and cavernous sinus, in the other cases, which are extremely few, it is due to an aneurism of the ophthalmic artery in the cranium. In about 71 per cent. of the cases it follows traumatism, in the remaining 29 per cent. its spontaneous origin is due to an existing chronic endarteritis of the internal carotid. Immediately following rupture of the artery, blood escapes into the sinus, and the pressure in the sinus is raised to a degree depending on the size of the rupture. This increase of pressure causes an interference with the venous return through the superior ophthalmic vein, and a state of passive congestion in the territory of the vein follows. The symptoms indicative of passive congestion may develop rapidly or slowly, according as the opening between the artery and sinus is large or small, and as a rule they appear early, but it is some days or weeks before they are fully developed. The characteristic symptoms are exophthalmos, pulsating tumor at the inner angle of the orbit, bruit, and pulsation. The most prominent symptom is the protrusion of the eyeball, which in most cases reaches a high degree. The lids become swollen, œdematous, and discolored; the conjunctiva is chemotic, and its veins are distended and tortuous. If paralysis of the ocular muscles be present, the axis of the eye deviates, and motility is interfered with. Following the distention of the superior ophthalmic vein, its circulation is reversed, and with thickened

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walls the vein becomes practically an artery, and it forms a
pulsating tumor at the upper and inner angle of the orbit. This
tumor is soft and reducible, is made up of a mass of pulsating
and tortuous veins, and possesses a distinct bruit and thrill.
Pulsation of the globe is marked, and in most cases is visible,
but it can always be appreciated by palpation. The bruit is of
a continuous character, and increased at each systole, and is
best heard over the globe, the pulsating tumor, and the supra-
orbital region. In the eye, the retinal veins are seen to be
greatly distended and pulsating; hæmorrhages may occur, and
in some cases papilloretinitis is present. Sight may be unim-
paired, but later it grows weaker, and blindness may follow.
Subjectively, the symptoms are well marked, the patient com-
plaining of severe headache, disturbing sounds in the head, and
ringing in the ears, and it is generally for their relief that he
seeks help. Momentary digital compression of the carotid
on the affected side is followed by the disappearance of pulsa-
tion and bruit, protrusion of the bulb lessens, the pulsating
tumor sinks, and the subjective symptoms are relieved, but, on
removing the finger, the previous condition speedily returns.
The sequence of the symptoms may vary, but, as a rule, ex-
ophthalmos appears before pulsation. The natural course of
the disease, and the ultimate result of the process, if left to
itself, or if not affected by treatment, is a steady increase of the
symptoms, when, having reached their height, the exophthal-
mos, the chemosis, and the swollen lids gradually subside, but
the subjective symptoms, as well as the pulsating tumor remain,
and the eyesight, gradually growing weaker, is finally de-
stroyed. In a few instances spontaneous cure has resulted.
The treatment of arteriovenous aneurism of the internal carotid
and cavernous sinus presents a different proposition in com-
parison with the treatment of a similar process in other parts of
the body. The indication to be met is different, and we are
limited in our choice of a method. In the extremities, for
instance, in attempting a radical cure, we can shut off the flow
of arterial blood into the vein by means of the double ligature,
or we can make use of the quadruple ligature and extirpate the

sac. Such methods are obviously impossible in the treatment of the variety under consideration, and the problem to be solved is the reduction of the pressure in the sinus, so that the passive congestion in the superior ophthalmic vein and its branches may be relieved. The results of autopsies have added nothing conclusive concerning the healing process, but it has been represented as follows. The rent in the arterial wall is plugged with a firm clot, and, in order that it may withstand the pressure of the carotid, a reduction, or temporary abolition of the carotid pressure, is necessary. This is accomplished by ligation of the common carotid, and the blood then coagulates in the artery, as well as in the cavernous sinus, and the superior ophthalmic vein. The clot, thus resting quietly and supported on either side, gains a chance to organize, and by the time the collateral circulation is established, the healing process has reached a point of safety. Healing of the rent in the artery, in this manner, may be possible when the rent is very small and due to disease of the arterial wall, as the local conditions in the idiopathic cases are more favorable for coagulation of the blood. In the traumatic cases, however, such a healing process is not likely, as the arterial wall is healthy, its inner surface smooth and of normal consistence, accordingly the chances for coagulation are not favorable. Healing in these cases is probably from thrombosis, beginning at the superior ophthalmic vein and extending into the sinus, thus giving the necessary lateral support. When the communication between the artery and sinus is large, and rupture follows traumatism, complete closure of the opening by an organized clot is hardly to be expected, as, owing to the collateral circulation, the artery soon refills, and the pressure is greater than the clot can withstand. In many of the successful cases following ligation of the common carotid, the bruit, which disappeared on the tightening of the ligature, returned later on, and in other cases it never completely disappeared. As the bruit, on its return, was diminished in intensity, or had changed the character of its tone, it is evident that the rupture was not completely closed, but rather that the size of the opening was smaller. In these cases it is

probable that the clots deposited on the edges of the rent maintained their position through the reduction of arterial pressure by ligation, and that, by the time the collateral circulation was established, they were so far organized that the healing process could continue. When the healing was complete, the opening between the artery and sinus had narrowed down enough to allow the sinus to carry off the excess of arterial blood entering it, and thus the pressure in the sinus was not sufficient to cause passive congestion in the superior ophthalmic vein. As spontaneous cure is possible, and from the fact that a few cases have recovered under medical treatment, some authorities still advise the trial of local and internal remedies before a resort is made to surgical measures. Such advice is very unwise, since the chances of success are remote, and the time thus spent may result in the serious impairment, if not the loss, of sight. Medical treatment is indicated in cases where the patient is very old, or when the arteries are so diseased as to forbid surgical methods. In the beginning of the disease, when the symptoms are not developed sufficiently to allow of a diagnosis, rest in bed, cold applications, narcotics, etc., are indicated; but when the nature of the trouble is recognized, then surgical treatment should be promptly instituted. As to the surgical methods, we have the choice of compression or of ligation of the common carotid artery. Compression, previous to the days of antisepsis, was considered the safer method, but its results have not been satisfactory, as may be readily understood when one considers the difference which exists between a true aneurism and an arteriovenous aneurism. Its use is limited to the treatment of the idiopathic cases, where the conditions are more favorable for the deposition of clots. Compression with the finger is preferable to an instrument, but the method is always inconvenient, often painful, and its success is dependent on many conditions difficult of control. Sattler reported twenty-nine cases treated by compression, and in only four of them was there a cure. Slomann has added twenty-four cases to those reported by Sattler, making fifty-three cases in all. Of these, fifteen were cured and improved, apparently an improvement on Sattler's

figures, but in Sattler's list there were four cases improved, thus making his percentage 31 to Slomann's 27. These percentages of success are so much less than those obtained after ligation of the common carotid, that the latter method is by far the preferable one. Ligation of the common carotid artery may be said to be the operation of choice among surgeons, and as such is recommended in the surgical text-books. Pulsation and bruit, as a rule, disappear with the tying of the ligature, and the exophthalmos, the chemosis, as well as the subjective symptoms, steadily subside, and in the successful cases cure is complete from within three to six weeks. As previously stated, the bruit in many cases returns, but weaker and changed in character. The results of ligation have been satisfactory, the mortality is much less as compared with the mortality in general of the same operation, and secondary cerebral disturbances are uncommon. The mortality, in general, after ligation of the common carotid, is very considerable, probably above 25 per cent.; in exophthalmos following carotid ligation, the mortality is 10 per cent. Secondary cerebral disturbances, the greatest danger attending carotid ligation, occurred in only four of the sixty-three cases reported by Sattler, and in every instance it was an idiopathic case, and the patient a woman. The results of ligation have been collected by Sattler and by Slomann, whose work is a continuation of the former's extensive monograph. Sattler, in 1880, collected all cases hitherto reported, and they were fifty-six in number. The results were, healed, 37, or 66 per cent.; unimproved, 11, or 19 per cent.; died, 8, or 14 per cent.

Slomann, in 1898, reported ninety-five cases. Of these were, cured, 49, or 51 per cent.; improved, 17, or 17 per cent.; unimproved, 17, or 17 per cent.; died, 10, or 10 per cent.

The term "healed," as used by Sattler, includes those cured and improved. In comparing these lists, it will be seen that the percentage of cured and improved is nearly the same, but the mortality is reduced by 4 per cent. Whether the successes were permanent is uncertain, as in the majority of cases classed as "healed" the patients were lost sight of after their

discharge. Bodon, in 1899, collected all the reported cases of traumatic exophthalmos treated by ligation of the common carotid. They were fifty-eight in number, with the following results: Cured, 26, or 46 per cent.; improved, 20, or 35 per cent.; unimproved, 6, or 10 per cent.; died, 6, or 10 per cent.

The results are apparently very satisfactory, as in 80 per cent. of the cases the operation was followed by cure or improvement. In six cases blindness resulted, as the operation was done too late. The time of its performance varied from four to sixteen weeks (in one case eighteen months) after the injury. This unfortunate termination in 10 per cent. of the cases emphasizes the necessity of an early operation. Four of the six deaths were due to sepsis and hæmorrhage, complications which are less liable in the future, owing to the asepsis of the present day. In comparing the results reported by Slomann with those of Bodon, it will be noticed that the proportion between those cured and those improved is much greater in Slomann's list, and its explanation is due to the fact that Bodon's list is limited to the traumatic cases. Recurrence is much more frequent in the traumatic cases; in the eleven cases of Sattler, eight were traumatic, and is due to the local condition being unfavorable for the deposition and organization of clots about the rupture in the arterial wall. The refilling of the artery, with the accompanying rise of pressure, should take place slowly and gradually, in order that the healing process should proceed satisfactorily. This process, therefore, depends on the rate at which the collateral circulation is established. The later its completion the better the chances of success. After the ligation of the common carotid artery, the collateral circulation is completely established by the free communications existing between the carotid arteries of opposite sides, both outside and inside of the skull, and through the superior thyroid artery of the side on which the carotid has been tied. The superior thyroid artery plays an important part in the establishment of the collateral circulation, and in several cases this artery was found, some weeks after the carotid ligation, to be dilated and strongly pulsating, while in the portion of the common carotid

above the ligature, and in the facial and temporal arteries, pulsation was absent. Legouest (quoted by Bodon) ligated the left common carotid in a traumatic case eight weeks after the injury. No improvement followed, and he then tied the external carotid below the origin of the superior thyroid artery. Improvement immediately followed; the bruit which was present disappeared, and cure was complete at the end of the fourth month. By cutting off the superior thyroid supply, the establishment of the collateral circulation is thereby delayed, and time is gained for the organization of the clots deposited upon the edges of the rupture. Tying the internal instead of the common carotid, therefore, offers a better prospect for success, and, in my opinion. ligation of the internal carotid artery should be the operation of choice. In a number of cases after ligation of the common carotid complete recurrence has followed, the appearance of the symptoms varying in time from a few hours up to ten weeks, in one case not until nine months had elapsed after operation. On compressing the other carotid, the pulsation and bruit disappear, and from this fact the second carotid may be ligated. Bodon, in 1899, collected all the cases on record of ligation of both common carotids for the cure of pulsating exophthalmos. He found five cases, and adding one of Dollinger's there were six cases in all. The first case was that of Gurdon Buck, in which fourteen months elapsed between the two operations. All the symptoms disappeared after the second operation, but sight of the affected eye was lost. The second case, by Foote Williams, the second operation thirty days after the first, complete cure at the end of the fourth week, sight decidedly improved. The third case, by Le Fort, fifty-four days interval, complete cure, patient perfectly well eighteen months after the last operation. The fourth was by Reeve, no mention of time interval, and the result a failure. The fifth case, by Francke, sixty days between operations, gradual improvement, cure complete at the end of a year. The sixth case, by Dollinger, first operation five months after injury, second operation thirty-two days after first, and followed by improvement. In considering these cases, one is impressed

by the fact that the operation was attended with no mortality, and, with the exception of Reeve's case, the patient was cured or improved. In Buck's case, the second operation was performed too late to save the sight, and it is a warning to us not to wait too long before performing the second operation. The ligation of both carotids is apparently not as dangerous as we would imagine, and the absence of mortality in the list reported is explained by the fact that the arteries were not diseased. The final outcome in Dollinger's case is of special interest, as it has a practical bearing on the treatment of pulsating exophthalmos. Ten weeks after the second operation, the severe headache returned, exophthalmos had increased, and at the inner angle of the orbit was a pulsating tumor, compression of which caused a complete disappearance of the bruit and a diminution of the headache. Dollinger, through an incision above the supraorbital arch, tied off several small veins, and then resected about half an inch of the enlarged and thickened superior ophthalmic vein. The bruit immediately disappeared, the headache was relieved, and thirteen days afterwards the patient was discharged cured. Woodward reports a similar experience. After ligation of the common carotid the exophthalmos and subjective symptoms disappeared, the bruit, however, returning from time to time. Ten weeks afterwards the patient returned, complaining of ringing noises in the head, which he could stop by pressure on the nose at the inner angle of the orbit. Woodward then ligated the enlarged veins at the inner and upper angle of orbit; the ringing noises disappeared, and when seen, eighteen months later, the patient was perfectly well. Cure in these two cases was probably due to thrombosis, beginning at the site of the ligature, and spreading into the cavernous sinus. These results suggest the possibility of a cure by merely tying off the mass of enlarged and pulsating veins at the inner angle of the orbit, and, if not successful, then the carotid ligation should follow. When recurrence follows ligation of the carotid, it would be well, and certainly safer, to ligate and resect the veins before attempting the ligation of the second carotid.

Slomann, in 1898, collected all the cases of pulsating ex-
ophthalmos reported up to that time, including Sattler's cases,
and they were 197 in all. After excluding twenty-two cases,
in which the characteristic symptoms were in the course of an
non-aneurismal disease, and which Slomann designated as
" false pulsating exophthalmos," there remained 175 cases of
the true variety. From these figures it would appear as if the
disease is not uncommon, but, as the number comprises all
cases reported during the past eighty-eight years, it will be seen
that the disease is rather rare. Consequently, it may be of
interest to report a case which was referred to me for operation
by Dr. Charles S. Bull, to whom I am indebted for the patient's
history previous to his admission to my service at the New
York Hospital. It is as follows:

R. M., male, twenty-nine years old, laborer, on the night of
January 8, 1902, was struck on the left parietal region with a
bottle. The bottle was full of beer, and was not broken by the
blow. The patient was not knocked down by the blow nor ren-
dered unconscious, and there was no laceration of the scalp. The
next morning he became conscious of a continuous roaring noise
in the left side of his head, which rapidly grew and extended
all over his head. On the second day the left eye began to pro-
trude and the eyelids to swell. Within a week both eyes showed
enormously distended conjunctival and subconjunctival veins, and
engorgement of the subcutaneous veins of both sides of both eyes,
the engorgement and distention of all the vessels being more
marked on the left side. Headache was severe during the first
week; this soon abated, and the patient was left with a sense of
confusion, which he attributed to the constant noise in his head.
He applied at the New York Eye Infirmary early in February,
nearly a month after the injury, and the following condition was
noted. The left eye projected directly forward, and at least one-
half of its anteroposterior diameter projected beyond the plane
of the orbit. There was marked chemosis of the conjunctiva and
great swelling of the lids, the œdema extending up under the eye-
brow, downward upon the cheek, and outward towards the tem-
ple. The skin of the lids was of a dusky, purplish hue from
obstruction to the venous circulation. The chemosis was most

marked downward and outward. The right eye also protruded slightly forward, but there was no chemosis. The conjunctival and subconjunctival veins of both eyes were greatly engorged and very tortuous. There was a loud bruit heard over the left eye and left side of the forehead and left temple, and this bruit was distinctly audible on the right side of the head, vertex, and occipital regions. There was a distinct pulsation of the left eyeball, perceptible to the eye as well as to the finger, but none of the right eye. There was no interference with the motility in any direction of either eye. The tension of the eyes was normal, normal pupils, and the irides of normal reaction. Vision was 20/20 in each eye, and there was no defect or limitation of the field of vision. The media were clear, and there was distinct pulsation of the retinal veins, which were greatly engorged, but without any accompanying hæmorrhages. He was admitted to the New York Hospital on February 26 for ligation of the common carotid. The symptoms had steadily increased. There was now distinct pulsation of the right eye, and above, and outward to the left eye, a mass of engorged and pulsating veins could be plainly felt. The axis of the left eye deviated outward, and its motility was impaired. On March 1 the left common carotid was ligated above the omohyoid muscle by two medium-sized chromic gut ligatures, three-fourths inch apart, the artery severed between the ligatures. Pulsation and bruit immediately ceased when the ligatures were tied. The exophthalmos, the chemosis, and swelling of the lids gradually subsided, and the patient left the hospital on the tenth day with wound healed per primam. During the stay in the hospital, the engorgement of the subconjunctival veins diminished but little, and was well marked at time of discharge. He was not seen again until February, 1903, nearly a year after operation, and there remained a slight degree of exophthalmos of the left eye, the subconjunctival veins less engorged. Patient felt perfectly well, and there was no bruit or pulsation anywhere to be discerned. The eyesight was good, the retinal veins were engorged and tortuous, and all over the retina of the left eye were the remains of numerous hæmorrhages.

In June, 1903, the patient appeared, complaining that the appearance of his eyes prevented him from securing employment, as their congested appearance suggested a free use of alcohol. Exophthalmos of the left eyeball was more marked, and the en-

gorgement of the subconjunctival veins had increased. Pulsation had returned in the external carotid and in the superior thyroid artery. A large tortuous vein of the forehead was seen; it started at about the supra-orbital notch and ran upward and outward towards the vertex. No pulsation or bruit. Beneath the vein could be felt a distinct fissure, which apparently ran into the roof of the orbit. No subjective symptoms. Further operation was advised, but the patient disappeared, and has not since been seen.

This was a case of double pulsating exophthalmos following traumatism, and apparently cured by ligation of the common carotid artery, but more than a year after operation symptoms of recurrence began to develop. As a rule, recurrence of symptoms after operation appear within a short time, generally a few weeks, and its delay for more than a year in this case is most exceptional. The protrusion of the right eyeball was undoubtedly due to rupture of each internal carotid into the cavernous sinus, and its extension by way of the circular sinus into its fellow of the right side. Double pulsating exophthalmos may be due to rupture of each internal carotid into the cavernous sinus, but generally the rupture is unilateral, and, owing to the pressure extending to the sinus of the opposite side, protrusions and pulsations of the opposite eyeball follow, but less marked than on the eyeball on the injured side. It will be noticed in this case that subconjunctival veins remained distended, while all other symptoms disappeared; and it is evident that the requisite reduction of pressure in the cavernous sinus was never obtained. With the complete return of collateral circulation, as seen by the presence of pulsation in the external carotid and superior thyroid arteries, the sinus pressure increased, and, as a result, the exophthalmos grew larger, the conjunctival congestion became more marked, and the supra-orbital vein made its appearance. The error as regards treatment was the ligation of the common carotid, and, had the internal carotid been tied, the chances of recurrence would have been lessened. Should another opportunity present itself in the future, I would tie the internal carotid. Should the patient re-

turn for operation, I would follow Woodward's example and ligate, and resect the branches of the superior ophthalmic vein at the inner angle of the orbit, and if necessary resect a portion of the main vein. In case of failure, then ligation of the opposite carotid would be indicated. Figs. 1 and 2 were taken before operation. The dotted lines in Fig. 1 indicate the area over which the bruit was audible. The crosses show the points of maximum intensity. In Fig. 2 is seen the extreme chemosis. Fig. 3 was taken a week after operation.

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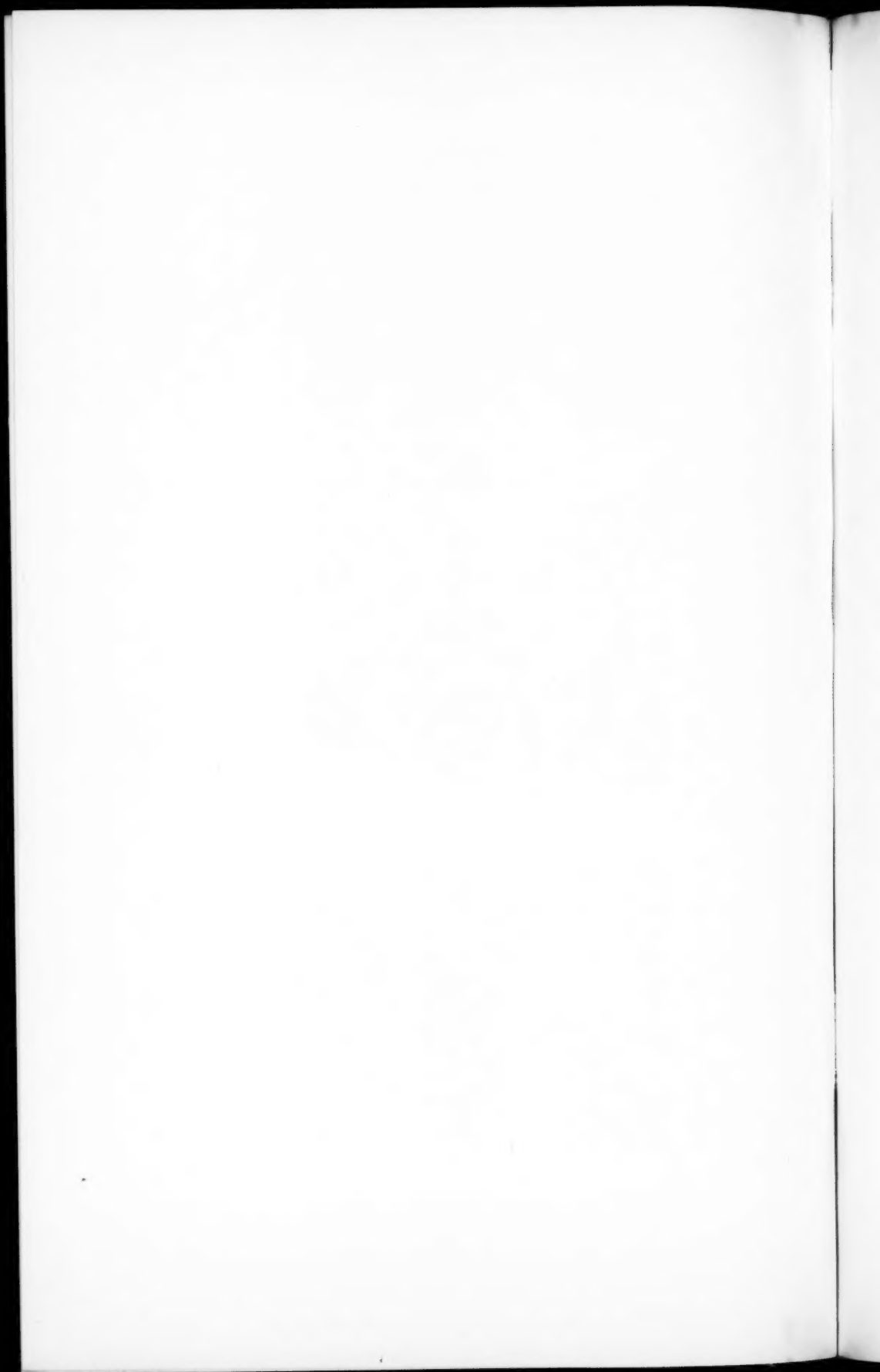L. A. Stimson. Aneurism, "System of Surgery" (Dennis), Vol. ii.

Fig. 1.—Dotted line indicates area of bruit. Crosses are points of its maximum intensity.

Fig. 2.—Shows the chemosis of conjunctiva.

Fig. 3.—One week after ligation of left common carotid.

LIP-TIE.

BY FREDERIC GRIFFITH, M.D.,
OF NEW YORK.

THE frænum of the tongue has its counterpart in the lips in a fold of mucous membrane extending in the middle line between the lips and gums of the upper and lower jaws, and known respectively as the superior and inferior frænum of the lips. While cases of tongue-tie are very common, until the present instance occurred I had neither seen nor read in the books of a similar condition of the lip which might well be called lip-tie. The patient was an Italian infant, who since birth presented a condition in which the inner surface along the middle line of the entire upper lip had been bound to the gum by a fold of tissue continuous with the mucous lining of the mouth and about one-eighth of an inch in thickness. The child's teeth are small but well formed, and there is no unusual interval between the upper central incisors. When the mouth is opened the middle of the upper lip is rolled directly inward, giving rise to a peculiar expression not apparent when in repose. The direct family history was negative. Treatment consisted in a cutting through of the partition half-way up its extent with blunt-pointed scissors, without the aid of anæsthesia, and tearing through the remaining portion by the aid of the fingers. Bleeding was momentarily free.

TRANSACTIONS

OF THE

NEW YORK SURGICAL SOCIETY.

Stated Meeting, November 25, 1903.

The President, HOWARD LILIENTHAL, M.D., in the Chair

SEVERE ELECTRIC BURN OF SKULL AND HANDS.

DR. OTTO G. T. KILIANI presented a man, an electric lineman
by occupation, who inadvertently grasped a live wire that he had
been sent to repair. In his desperate attempts to release his right
hand, which held the wire, his left wrist also came in contact
with it. He then fell, his head striking the trolley-rail, and for
ten minutes he lay there unconscious, with a current of 2750
volts passing through his body. After he was rescued he re-
mained unconscious for three hours. The following day, when
he was brought to the German Hospital, he was in a semiconscious
condition. An examination showed severe burns covering the
right palm and fingers, the left wrist, and the right side of the
skull. The ring and little finger of the right hand had been com-
pletely severed by the contact of the wire. The patient com-
plained of severe pain throughout the entire body, but especially
in the head and hands. Two days later his face became enor-
mously swollen; this was only temporary, and was probably due
to interference with the lymph currents (not inflammatory). The
mental faculties were apparently unimpaired by the strong cur-
rent of electricity that had traversed the brain for at least ten
minutes. Profuse hæmorrhages repeatedly accompanied the
dressing of the burns. The bleeding apparently emanated from
the veins and arteries in the granulation tissue, and was probably
due to decomposition of the vessel walls. As it was impossible
to apply a ligature or control the bleeding by compression, it

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became necessary to dissect out the vessels and follow them for two inches or more before they were found sufficiently sound to permit of the application of a ligature. Some of the bones of the left wrist were so severely burned that they had to be removed. The wound on the skull presented a large section of bone denuded of periosteum; the outer plate was found to be necrotic throughout the entire extent of the burned area, three inches by four, a smaller portion of which was necrotic through the entire thickness of the skull. This necrotic bone, representing an oval disc of three by four inches, could be removed by the elevatorium, leaving the dura exposed to quite an extent. without difficulty. The wound healed by granulation, and was later on covered with skin-grafts by Thiersch's method.

DR. F. W. MURRAY said that in a case of severe electric burns affecting the face, arm, and leg which he saw at the New York Hospital, the granulations bled very freely when the wounds were dressed. The case resembled that of Dr. Kiliani's in this particular, but it was never necessary to tie any vessels.

DR. LILIENTHAL said the pain throughout the body that the patient complained of after the injury might be explained by the very severe tonic contraction of the muscles during the time that he was in contact with the electric current.

THE TREATMENT OF PULSATING EXOPHTHALMOS.

DR. F. W. MURRAY read a paper with the above title, for which see page 421.

DR. LILIENTHAL said that in a case of pulsating exophthalmos which he showed several months ago, ligation of both common carotids was followed by temporary improvement, but it did not produce a total disappearance of the symptoms. The patient, a young girl, still complained of buzzing in the head immediately after the second ligation, which was done within a week of the first, although the nose had greatly diminished. The exophthalmos diminished also, but never entirely disappeared, and the symptoms gradually became worse until within a few months something more had to be done. An Omega-shaped flap was then raised in the temporal region, but on endeavoring to make an exploration with the finger the hæmorrhage was so severe that the wound was packed for forty-eight hours; a thorough exploration was then

possible, and a pulsating tumor could be distinctly felt underneath the dura. It was not considered advisable to interfere with this tumor. The operation relieved the patient to a considerable extent from the headache from which she was suffering, but it had no effect upon the buzzing and exophthalmos. The flap was put back in place and the soft parts healed by primary union excepting at one point left for drainage. Non-union of the bone still persisted, and the entire flap pulsated.

The cause of the exophthalmos in this case, Dr. Lilienthal said, was apparently an arteriovenous aneurism of obscure origin, probably of the cavernous sinus. The buzzing in the head had existed since childhood. An operation for mastoid disease had been done abroad, but this was after the onset of the other symptoms.

As a further expedient in this case, the speaker suggested the possible advisability of injecting gelatin into one of the enlarged veins about the orbit.

Two other causes of unilateral pulsating exophthalmos were referred to by Dr. Lilienthal, namely, a soft sarcoma of the globe and of the orbit. He considered the condition a rather hopeless one at best.

DR. MURRAY said that in the case mentioned by Dr. Lilienthal he would be inclined to expose the large and tortuous veins about the orbit and tie them off. That failing, he would ligate the internal carotids. He had no experience with the injection of gelatin into the enlarged veins, but in a number of cases where this injection of substances causing coagulation had been resorted to bad results had followed. As to the other causes of pulsating exophthalmos mentioned by Dr. Lilienthal, the speaker said that those cases had been classed by Slomann as false pulsating exophthalmos. In these the vein was not affected, and they did not give all the symptoms that were present in the true variety.

VESICAL CALCULI FOLLOWING SUPRAPUBIC PROSTATECTOMY.

DR. LILIENTHAL presented a calculus removed from the bladder of an old man who was operated on last summer by another surgeon for an enlarged prostate. The operation, a suprapubic prostatectomy, was followed by relief of the retention. The

patient soon afterwards developed a cystitis, with great frequency of urination. The urine contained considerable pus and mucus, and the patient suffered so much distress that he again sought relief.

Upon sounding, a calculus was found in the bladder. A suprapubic opening was made through the cicatrix and several calculi removed. Each stone contained a nucleus which at first sight appeared to be a bit of gauze, but upon closer examination, after dissolving the calcareous substance with hydrochloric acid, it proved to be a fragment of tissue, very tenacious, fully half an inch wide and about one-eighth of an inch thick. Upon inquiry, Dr. Lilienthal said he learned that the patient's bladder had not been irrigated after the prostatectomy, although it had been drained.

The case illustrated the importance of thorough and frequent irrigation of the bladder after prostatectomy, particularly after the suprapubic operation.

TRANSACTIONS

PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, November 2, 1903.

Henry R. Wharton, M.D., in the Chair.

OSTEITIS DEFORMANS.

Dr. John B. Roberts said that he had reported a case of leontiasis ossium, or hypertrophy of the bones of the face, at a meeting of the Section on Surgery of the College of Physicians of Philadelphia, November 8, 1895 (Annals of Surgery, 1896, Vol. xxiii, p. 303). The woman, who was twenty-two years of age, had suffered from the time she was six years old with a slowly increasing enlargement of the upper and lower jaw-bones. Such cases are supposed by some writers to be an early stage of osteitis deformans. He had unsuccessfully endeavored to find the woman mentioned, in order to see whether there has been any change in her condition that would throw light on the possible relationship of these two disorders of the bones.

Leontiasis ossium, sometimes called Virchow's disease, and osteitis deformans, often called Paget's disease, are evidently, in his opinion, trophoneuroses. The two conditions are therefore probably related, even if the disease manifested by enlargement of the bones of the face is not actually osteitis deformans, beginning in the facial bones instead of in those of the extremities and cranium. He presented an illustration of the face of the young woman. ("Deformities of the Face." By John B. Roberts. Second Edition, 1901, p. 19.)

Now he reported a case of typical osteitis deformans occurring in a man. The patient, sent to him about a year ago by

Dr. H. E. Schlemm, had applied to that physician because of his increasing loss of stature, which had attracted the attention of his friends; otherwise he had, in his own opinion, no special symptoms of illness, except that he had been of late somewhat below par in general health. The bony lesions, other than the diminution of height, had been unobserved.

The gentleman, who was aged forty-seven years, and un-married, knew of no family history of gout or rheumatism, and had no definite knowledge of any condition similar to his in his ancestors or collateral relatives. His father's father had died at the age of eighty years of cystitis; his father's mother at the age of eighty years of dropsy; his mother's father at sixty of dropsy, and his mother's mother at eighty-two of dropsy. He knows of no instance of bandy-legs or bow-legs in the family, except that his father's father just mentioned is said to have become bow-legged as he increased in age. His father had died at the age of sixty-two years of what was called heart-failure, although there was also a history of some kidney disturbance. Some of the friends of the family say that his father before death walked like the patient. The latter, however, does not know that his father became shorter in stature, but says that he became very bent and stooped. His mother still lives at the age of seventy-two years and is in good health.

The patient has living at this time two sisters and three brothers in good health. One brother died of dropsy at the age of thirty-nine. Ten years previously he had received a shock by falling at a roller-skating rink and fracturing one arm. The patient does not know which arm, or whether the injury was above or below the elbow. Later he had suffered from an injury to the right hip, but there was no fracture at that region. Dur-ing the ten years from the time of the receipt of the fracture of the arm and his death he gradually became weaker, and had to be rolled about in a chair for three or four years; but he was not paralyzed in the legs. The man was dropsical and swollen, and it gave pain to lift him, so that some sort of apparatus was made by which he could be lifted by the attendants.

The present patient does not know that this brother had any tendency to stiffness of the joints at this time, nor that there was any tendency for his bones to bend. The right side of the lower jaw was, however, swollen, and the patient thinks that this

swelling of his brother's face was situated in the jaw-bone. He has no recollection of his brother complaining of pain in the jaw.

The patient is the eldest child of his parents. About fifteen years ago he fractured his left humerus about one inch above the elbow by being thrown from a street car. There was no cutaneous wound. The bone rapidly united, but he dates the beginning of his decline in health from the time of that accident. He has never had any serious disease. There is no history of gonorrhœa or syphilis. He has never suffered from abscess and has never had scrofulous lesions, rickets, or typhoid fever. There is no history of ague, rheumatism, rheumatic pains, or jaundice.

About twenty years ago he had a boil upon his right thigh, but this lesion seems to have been unimportant. About ten years ago he weighed in the neighborhood of 160 pounds, and was about five feet nine and one-half inches in height. Now he measures five feet six and one-fourth inches with his shoes on, and weighs about 150 pounds. His physician says that the patient was very erect in his carriage.

Four or five years ago the patient's friends called attention to the fact that he was becoming shorter. He apparently paid very little attention to this symptom until recently. Since that time he has been taking a month's holiday each year, because he found that he was a little run down in health. His business has kept him a good deal confined to his office.

On examination the patient had a pallid, anæmic look, and gave the appearance of his arms and legs being too long for his body. He said that he had no digestive disturbance, was not constipated, and was temperate in eating and drinking. According to his own statement, the color of his skin was better than it had been for several years. Examination of the lungs was negative, as was that of the heart, except that there seemed to be a systolic murmur, possibly attributable to the excitement of the examination. He, however, said that he got easily out of breath from going upstairs, and that when he walked his knees felt weak. There had been no hæmoptysis. His urine was acid, had a specific gravity of 1026, and was free from albumen and sugar.

He used glasses for reading and had a slight degree of hyperopic astigmatism, his refraction being plus .75 sphere combined with plus .75 cylinder axis 90 in each eye. His hearing and teeth were good. He himself had no knowledge of his change

in stature until his attention was called to it by his friends, though he had been feeling that he was not quite up to his general standard of health.

When the patient was stripped, the normal hollow of the back in the lumbar region was gone, and the spine in that location bulged backward just above the sacrum so as to change the normal lumbar concavity into a slight prominence backward. This change was not at all like the angular deformity which occurs in tubercular spondylitis, but was a general bulging backward of the whole region. The femurs, especially the right one, were unnaturally convex forward and perhaps bowed a little outward. The right clavicle, which had never been fractured, was massive, being, at least twice as thick as the left clavicle, which seemed to be of normal shape and size. The left humerus was very much thicker than the right, especially in the lower half of the shaft and the condyles. This was the bone which had been fractured years previously, but the enlargement is a general one, and not like that at the seat of an old fracture with displacement and callus. The enlargement of this bone existed in the upper portion to a less extent than in the lower portion. The left tibia had a distinct enlargement in the region of the tubercle, which extended downward in a promontory-like mass upon the front of the bone. The rest of the tibia was normal in size and shape.

There was no stiffness of the joints. There were no gouty deposits in the fingers, toes, or ears. There was no rhachitic rosary upon the ribs, and no rhachitic-like deposits at the wrists or ankles. Because of the bending of the lumbar region of the spine, the lower ribs and the crests of the two ilia were only about a finger's-breadth apart.

The head looked very big at the back, though he had not been aware of this peculiarity until asked whether he had recently been obliged to increase the size of his hat. He then said that about two years ago the number of his hat was $7\frac{1}{4}$, whereas now it was $7\frac{1}{2}$. There was no enlargement of the jaws or facial bones nor of the hands or feet.

In an article by Dr. J. C. Wilson, in the *Philadelphia Medical Journal* of the early part of this year, it is stated that up to that time there had been but seventeen cases of osteitis deformans reported as observed in this country. Hence the report of the

present case, which shows most of the typical symptoms, and differs from most of the cases reported only in the circumstance that the kyphosis, or bending backward of the spine, occurred in the lumbar rather than in the cervicodorsal region.

The pathology of the condition is interesting. Microscopical examination shows absorption of healthy bone and formation of new bone coincident with this absorption, but apparently not connected with the absorptive process. The new bone may show a failure of calcification, may itself become absorbed, or may finally become calcified. The condition appears to differ from osteomalacia, because synchronously with the absorption of the bone a process of regeneration takes place, and because, instead of fracture occurring, the bones have a tendency to bend as in rickets. The statement that leontiasis ossium affects the bones of the face only, and not those of the cranium or extremities, does not seem to be verified. On the other hand, some cases of osteitis deformans, it is said, show hypertrophy of the bones of the face as well as of those of the cranium, which is the region of the head that ordinarily is affected. It seems probable that there is some relation between these two conditions and the common disease called osteo-arthritis, rheumatoid arthritis, and rheumatic gout. Acromegaly differs from the conditions under discussion, at least in its clinical manifestations, because in it the enlargement occurs in the feet and hands as well as the head, and seems to involve the soft parts as well as the bones. From a study of the recent articles on the subject, Dr. Roberts was inclined to believe that osteitis deformans is a nutritive or trophic disorder, due, as suggested by Prince (*American Journal of the Medical Sciences,* 1902, Vol. cxxiv, p. 796), to a modification or perversion of the natural processes occurring in normal bones.

Dr. De Forest Willard said that, owing to the rarity of this condition, no one physician had the opportunity to make a clinical study of many cases. He has seen but two cases, both being aged women. The pathology of the affection is uncertain. Dr. Willard believes that rheumatoid arthritis, osteitis deformans, and leontiasis ossea are in some way related to each other. In all there is a tendency towards the deposit of extra bone and the production of deformities. When the pathology of the conditions in question is ultimately worked out, it will probably be found that, although dissimilar, they all belong to one general group.

DR. WILLIAM J. TAYLOR mentioned a case of leontiasis ossium that involved the frontal bone. A mass of the new formed bone varying from one to two inches in thickness was chiselled away by Dr. Keen. This bone was subjected to a very careful microscopic examination, which revealed no definite structure other than that of normal bone. The patient made a good recovery from the operation, but whether recurrence followed is not known.

DR. HENRY R. WHARTON had seen two cases of osteitis deformans, one of which, occurring in a man, was under the observation of the late Professor Ashhurst and himself during more than ten years. The second case was in a woman forty years of age. Among the points of interest in these cases is the diagnostic importance of a gradually diminishing stature. This change is largely due to curvature of the bones of the thigh and leg, but changes in the spine also aid. This curvature also involves the bones of the upper extremity, including the clavicle. Another interesting point was the slight impairment of general health in both cases mentioned. The one under observation for ten years showed no failure of his general condition. The other patient was seen only for a short time, but her health was then good. As to treatment, nothing seems to be of avail. The man was for months given potassium iodide without producing any effect.

SUBACUTE INTESTINAL OBSTRUCTION.

DR. W. J. HEARN said that many cases were brought to the Jefferson Hospital to be operated on for a supposed obstruction of the bowel which really does not exist. The history of such cases is usually as follows: The patient has probably had an attack of acute indigestion with pain, and, as happens too often in such cases, morphine has been administered to relieve the pain. Then follows the necessity of opening the bowels which the morphine has constipated. Frequent doses of purgatives cause the patient to vomit; enemas are given which only wash out the lower, but do not relieve the upper, bowels, and soon the patient is supposed to have obstruction of the bowel. But certain important symptoms that indicate genuine obstruction are wanting. There is no temperature; the pulse is almost normal; it may be somewhat rapid, but that will be due to the excitement and

apprehension suffered by the patient on finding the bowels cannot be opened. There is but slight distention of the abdomen. There is no muscular tension of the abdominal walls. There are no points of tenderness nor general tenderness over the abdomen. In these cases Dr. Hearn usually recommends a cessation of attempts to evacuate the bowels. He simply permits the patient to rest without any medicine at all, and soon nature rights itself. Many cases of appendicitis or general peritonitis from any cause whatever are mistaken for obstruction, but the lack of abdominal distention and the presence of the usual symptoms of appendicitis and peritonitis reveal the cause of the trouble. Persistent vomiting, great abdominal distention, and inability to pass any gas whatever through the intestines, and, later, great tenderness, a rapid pulse, and a significant facial expression indicate, as a rule, acute obstruction, and if there be fæcal vomiting, which is usual, the diagnosis is complete. But in the subacute and chronic obstruction the diagnosis is much more difficult. Then the surgeon confronts a question of great gravity and peril to the patient. In these cases the obstruction is not at first complete and the symptoms develop more slowly. The abdominal distention is later coming on, and the patient is able to pass some gas from the bowels. By the time the symptoms are those of complete obstruction, the patient suffers either from general peritonitis or local gangrene of the intestines, and the prognosis, as is well known, is much more unfavorable than in the acute cases. These facts are demonstrated in four cases now reported, as follows:

Intestinal Obstruction due to an Enterolith in the Small Intestine.—A patient of Dr. Kollock, of Newark, Delaware. A woman, aged sixty years, well nourished, abdomen very fat, without previous history of colic of any kind whatever. She was attacked with colicky pains in the lower portion of the abdomen. Up to the time of this attack the bowels had been opened as well as usual as far as she knew. The pains were at first accompanied by vomiting the contents of the stomach and afterwards bile and mucus. Then the vomiting would cease, and two days would elapse before it would occur again. On the seventh day after the first attack she vomited fæcal matter for the first time. She was able to pass flatus through the intestinal canal and with some relief to the pain, but no fæcal matter. On

the tenth day, when seen by Dr. Hearn, she was suffering considerable abdominal pain, but there had been no vomiting at all on that day.   There was moderate distention of the abdomen and a more rapid pulse than normal.   The area of tenderness on pressure was in the right iliac region.   Laparotomy was advised on the basis of the vomiting of fæcal matter which had occurred. No other symptoms were present to justify it, with the exception that her bowels had not been opened.   An incision was made in the middle line and the parts were explored by the sense of touch. In doing so the hand accidentally came upon a mass in the ileum about eighteen inches from the ileocæcal valve.   This mass was delivered through the abdominal incision, and by palpation appeared to be the size of a hen's egg.   It apparently filled the entire lumen of the bowel and was immovable.   There were areas of gangrene in the peritoneal coat, also areas of gangrene in the mucous membrane of the bowels.   As these areas were apparently in a straight line, an incision was made into the bowel through these areas of gangrene about two inches long and the concretion removed.   The mucous membrane was closed first and then two rows of Lembert sutures through the peritoneal coat, thus inverting the gangrenous areas.   The patient made an uneventful recovery.   Nausea all ceased, and the bowels were opened on the second day voluntarily without any laxative.   The enterolith has been examined chemically by Dr. Stellwagon, who gives the following report.   " The concretion had for its base biliary calculus composed of cholesterin and fatty crystals surrounded by triple phosphates."   While this stone has for its nucleus a biliary calculus, yet the patient gave no history of ever having had an attack of colic.   Of fifty-one cases of intestinal obstruction caused by the impaction of gall-stones, collected by Wissing, thirty-eight died.   In some of these cases the calculi were of great size.   In the cases reported by Smith and Fagge they measured four and one-half by two and one-half inches in circumference.   In all cases enterotomy should be performed at once, and no attempt should be made to crush the enterolith in the lumen of the bowel, as has been suggested by some.   The method suggested by Tait, of passing a stout steel needle obliquely through the intestinal wall and attacking the calculus in order to break it up, is not worthy of approval.

RICHTER'S HERNIA; LOCAL GANGRENE; PERITONITIS AND DEATH AFTER OPERATION.

Miss P., aged forty-two years; well nourished, of rather large stature, previous health always good. Eight days before admission to the Jefferson Hospital she took an overdose of an expectorant mixture for a cold. It nauseated her and caused intense straining in the attempt to vomit. While straining in the effort to vomit, she suddenly felt a sharp colicky pain over the entire abdomen. She then vomited the contents of the stomach. On the following day there was no vomiting. Nausea was somewhat relieved, but there was no cessation of the pain, nor were her bowels open, notwithstanding she was given very active purgatives. On the fourth day the abdomen began to swell, and Dr. Hearn saw her then for the first time with Dr. Piper, her attending physician. Obstruction of the bowel was not then suspected, as the vomiting had apparently ceased. The groins were examined for hernia, but none was found, and she insisted she had never suffered from hernia. On the evening of the seventh day the vomiting commenced again, and was of a fæcal character. When Dr. Hearn saw her again, the next day, there was every evidence of general peritonitis; constant vomiting, rapid pulse, temperature 101° F.; a general tenderness over the entire abdomen, but no defined area of tenderness, with a facial expression that of general peritonitis. She was at once transferred to the Jefferson Hospital and operated the same day. An incision large enough to permit the entrance of the hand was made below the umbilicus. In carrying the hand down the side in the right iliac region, a portion of the intestine was found fixed in the right femoral canal. This was carefully detached from the point of adhesion and brought outside the abdomen. A portion of the bowel delivered presented the appearance of a large nipple and was gangrenous. Some of the contents of the bowel had escaped into the abdomen through the gangrenous tip of this nipple-like projection. About half of the lumen of the bowel had been drawn into the ring, and its width on the length of the bowel surface was about one inch and a half, culminating in a point. As the larger portion of this nipple was gangrenous, it was necessary to perform a resection of the bowel. Her condition was alarming, and, as it was necessary to ter-

minate the operation quickly, a Murphy button was used. The abdomen was thoroughly washed out with a salt solution, and closed in the usual manner with a drainage in the lower angle of the wound. During and after the operation her pulse was 140 and her temperature rose to $103^2/_5°$ F. The patient died the following day of general peritonitis.

SUBACUTE OBSTRUCTION CAUSED BY MECKEL'S DIVERTICULUM; OPERATION; DEATH.

Mrs. S. W., aged fifty-six years, for twelve years had suffered from occasional attacks of intestinal colic, accompanied by constipation and followed by diarrhœa, which would last for a week or ten days. On June 20, 1902, she was seized with pain in the abdomen, which was not localized to any particular region; during the following four days she had attacks of pain with intervals of complete freedom; the abdomen would become moderately distended and tender, and again these symptoms would disappear. Purgatives and enemas would bring away some fæcal matter and gas, but no free bowel movement was produced. Temperature between 98.6° and 100° F.; pulse between 80 and 90. Her family physician, Dr. Henry Lovett, of Langhorne, called Dr. Hearn to see her on the day after she was taken ill, but owing to his absence from the city his assistant, Dr. Roe, saw her on the second and third day, and they both saw her on the fourth day. Unfortunately, about the time of their visits, her symptoms had improved, and, as she was and had been a very delicate woman for many years, and as she had passed through very similar attacks previously, and more especially as her importunities not to operate if we could possibly avoid it were great, a waiting policy seemed justified. During the night of the fifth day her abdomen became distended and vomiting began, which soon became stercoraceous. The following morning the abdomen was opened by an incision through the median line; the intestines were found injected with some serous effusion in the peritoneal cavity. While exploring the posterior abdominal region, there came into view a short obliterated diverticulum, having a short mesentery, coming from the right side of the ileum about twenty inches from the ileocæcal valve and crossing over the free border and adherent to the posterior parie-

tal peritoneum. The diverticulum was divided between a distal and proximal ligature which included its mesentery. The intestine was then liberated and showed the point of constriction, which, however, did not require any repair. Although the symptoms of obstruction were relieved, the patient died four days later of general peritonitis, following the usual course of chronic obstruction.

GANGRENOUS RICHTER'S HERNIA RESULTING IN INGUINAL ABSCESS; INCISION AND DRAINAGE; SUBSEQUENT RESECTION AND ANASTOMOSIS OF THE ILEUM; RECOVERY.

A man, aged sixty-eight years, consulted Dr. Hearn, July 26, 1896, for a large phlegmon of the right groin. Previous to the present illness he had an attack of enteric fever at the age of twenty-five years, and twelve years before he had an enlarged gland in the right groin, which disappeared under treatment, and very probably was a hernia. There was no history of injury or infection of the genitals. About four weeks before coming to Dr. Hearn he was seized with griping pains in the abdomen; in the meantime he observed an enlargement in the right groin; a week later it took on growth and steadily increased. The skin over the enlarged area in the groin was dusky, pain throbbing, tension marked and fluctuation. He was admitted to the hospital and prepared for immediate operation. Upon incising the abscess it was found to contain about ten ounces of an admixture of pus and bowel contents. At the site of the femoral canal there was a small opening which communicated with the bowel. The cavity was irrigated and tamponed with iodoform gauze. A fæcal fistula remained after the abscess healed, and six months later he re-entered the hospital. On the following day Dr. W. J. Roe opened the abdomen, and after freeing the bowel did a resection and end-to-end anastomosis, using Halstead's rubber bobbins. Recovery was uninterrupted and uneventful.

DR. JOHN B. ROBERTS referred to two specimens of intestinal calculus that he had placed in the Mütter Museum. One of them was passed by a physician after an attack of acute pain in the epigastric region which had not yielded to treatment. Surgical advice was contemplated, but before it was obtained

something was felt to give away in the abdomen, and two days later a large calculus, together with a piece of sloughed tissue, was passed from the bowel. The second specimen referred to by Dr. Roberts was a calculus, one by three inches in size, which he removed from a woman who had had severe constipation during many years, and secured movements by rectal enemata. The calculus, which was located near the ileocæcal valve, was removed by enterotomy, and the patient soon afterwards died, although there were many reasons to believe that she would recover. This case was interesting because of the history that many years before the patient had suffered from some affection that produced jaundice. At the time of operation the hepatic region was explored, with the result of finding adhesions about the liver, but no trace of the gall-bladder. The nucleus of the calculus, which has never been opened, is believed to be a gall-stone which ulcerated its way into the intestine years before.

DR. JOSEPH M. SPELLISSY reported that in his service at St. Joseph's Hospital, and assisted by Dr. Davis, he had removed an enterolith having as its nucleus a common pin. The condition leading to interference existed for months, caused little distress, and consisted of an apparent thickening of the anterior and internal margin of the right iliac bone. While the density of the mass suggested it to be a new growth, its late characteristics pointed to a possible inflammatory origin. Incisions close to the iliac crest passed through an inch thick, apparently fibrous mass, into a small extraperitoneal abscess close to the bone, and containing the spindle-shaped enterolith. A persisting fæcal fistula marred an otherwise uneventful recovery. This fistula was later operated upon during the service of Dr. Davis and by him.

DR. JOHN H. GIBBON said that in the majority of cases of chronic obstruction of the bowels the large intestine was the site of the lesion, and that the cause of the obstruction producing subacute or chronic symptoms was usually a malignant growth. These patients, however, were generally admitted to the hospital for a complete obstruction following previous attacks of subacute obstruction. When operating on such cases where the obstruction is complete and the patient's condition is not good, it is thought to be better surgery to relieve the obstruction by performing colostomy rather than to do an immediate resection.

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Littlewood, in a recent article in the *Lancet,* has shown the great advantage to be derived from pursuing the former plan of treatment. Gibbon referred to a case of complete obstruction of the bowel due to a cancer of the sigmoid, in which he did an immediate resection and lost his patient. He believes that this patient might have been saved had he done a left inguinal colotomy and later resected the bowel.

EXCISION OF THE CONDYLE OF THE LOWER JAW FOR BONY ANKYLOSIS OF THE TEMPORO-MAXILLARY JOINT.

Dr. Francis T. Stewart presented a girl, aged six years, who twenty-two months ago was attacked by severe pain in the lower jaw and convulsions. The face swelled, pus escaped into the mouth, and five teeth were extracted without relief. Four months later some carious bone was removed from the lower jaw by an external incision. He first saw the child fifteen months ago at the Polyclinic Hospital. She then presented a complete ankylosis of the jaws and two sinuses on the right side, one near the chin and one near the angle of the lower jaw. An incision was made along the body of the jaw connecting these sinuses and a sequestrum the length of the body of the jaw removed. The wound resulting from this operation gradually contracted to a small sinus, but there was no improvement in the ankylosis, it being impossible to move the jaw in any direction. The region of the right temporomaxillary articulation was occupied by a swelling having the consistency of bone. September 28, 1903, the patient was etherized, a scab of collodion placed over the old sinus, and a small vertical incision made over the joint, the parotid gland and the temporofacial fibres being retracted towards the ear. The condyle could not be defined, a mass of bone continuous with the zygoma and glenoid fossa occupying the usual situation of the joint. The neck of the condyle was severed with a chisel, and as much condyle as possible was gouged from the joint cavity. Just at the completion of the operation, a large vessel was severed, and it became necessary to pack the wound. Two days later the wound was sutured except at the lower end, at which point a sinus still persists. Immediately after operation the patient was able to

open her mouth to the normal limit. She now eats solid food with comfort and has a jaw as freely movable as a normal jaw. There is a slight palsy of the orbicularis palpebrarum, which will probably disappear, as the temporofacial fibres were simply stretched and not severed.

DR. DE FOREST WILLARD gave a brief history of a case upon which he operated three weeks ago. The patient was a child who two or three years before had fallen while playing and had run a pointed stick into its mouth. The result was the repeated formation of abscesses which opened in a number of places on the cheek and near the ear. After some months a piece of wood was discharged from the temporal region, and healing of the sinuses followed. For two years nothing had been done to restore motion to the jaw, and the incisor teeth could be separated only one-fourth inch. From the history it was believed that interference with motion came principally from cicatricial contraction of the masseter and temporal muscles, and that myotomy of at least the masseter would be necessary. After etherization of the patient, screw power was inserted between the teeth, and the yielding was so marked that cutting of the masseter was dispensed with. By steady pressure the jaws were separated one and three-fourths inches. Now, at the end of three weeks, the mouth can be fully opened and mastication is nearly normal.

RUPTURE OF THE BRANCHES OF THE MIDDLE MENINGEAL ARTERY BY CONTRECOUP.

DR. STEWART related the history of a man, aged forty-five years, who was struck on the head by a weapon, and admitted to the Polyclinic Hospital in an unconscious condition September 19, 1903. There was a compound depressed fracture of the right parietal bone and a paralysis of the right arm and leg, but not of the face. The pupils were moderately dilated and reacted sluggishly to light. The depressed fragments of the right parietal bone were removed and a piece of gauze packed against a small opening in the longitudinal sinus. The left parietal bone was trephined and a clot of blood measuring about two inches in thickness and about four inches in length was found separating the dura from the skull and compressing the

brain. The clot was evacuated and the cavity packed with gauze, the bleeding apparently coming from a number of small vessels. The paralysis entirely disappeared by the third day, but the unconsciousness continued for two weeks. One week after operation there were a number of severe general convulsions; after reopening the wound on the left side and evacuating a large clot which had reformed, the convulsions ceased. The patient is now perfectly well, both mentally and physically.

DR. G. G. ROSS mentioned a case in which there was rupture of branches of the middle meningeal instead of the main trunk. He packed the area with gauze for three days, and there was no further trouble. He operated in three hours after the injury, though there were no symptoms, because of a depressed fracture. A clot of considerable size was found.

DR. JOHN H. JOPSON cited a case of meningeal hæmorrhage under his care one year ago in which there was rupture of the middle meningeal artery, but no accompanying fracture. He explains the so-called rupture by contrecoup by the fact that adhesions of the dura mater are weak in the region of the middle meningeal artery. Tension on the branches of the vessel at the time of injury, especially after a blow, may be great enough to cause rupture. Fracture of the skull may not occur, the artery being ruptured by the springing back of the bone. This he is inclined to think was the cause in Dr. Stewart's case. This form of rupture is apt to involve the branches instead of the main trunk of the vessel, and hence might easily account for the hæmorrhage from several places.

DR. HENRY R. WHARTON believes that, in packing to control hæmorrhage from the middle meningeal or the sinuses, the gauze is generally left in for too short a time. He has made it a rule to leave the packing in from five to six days or even a week if the wound remains sterile. The late removal of the packing is usually not followed by any considerable bleeding, as is the case where it is removed at an earlier period.

CONGENITAL DISLOCATION OF THE PATELLÆ BRACHYDACTYLIA.

DR. STEWART presented a man, aged thirty-nine years, who came under observation at the Pennsylvania Hospital for fracture
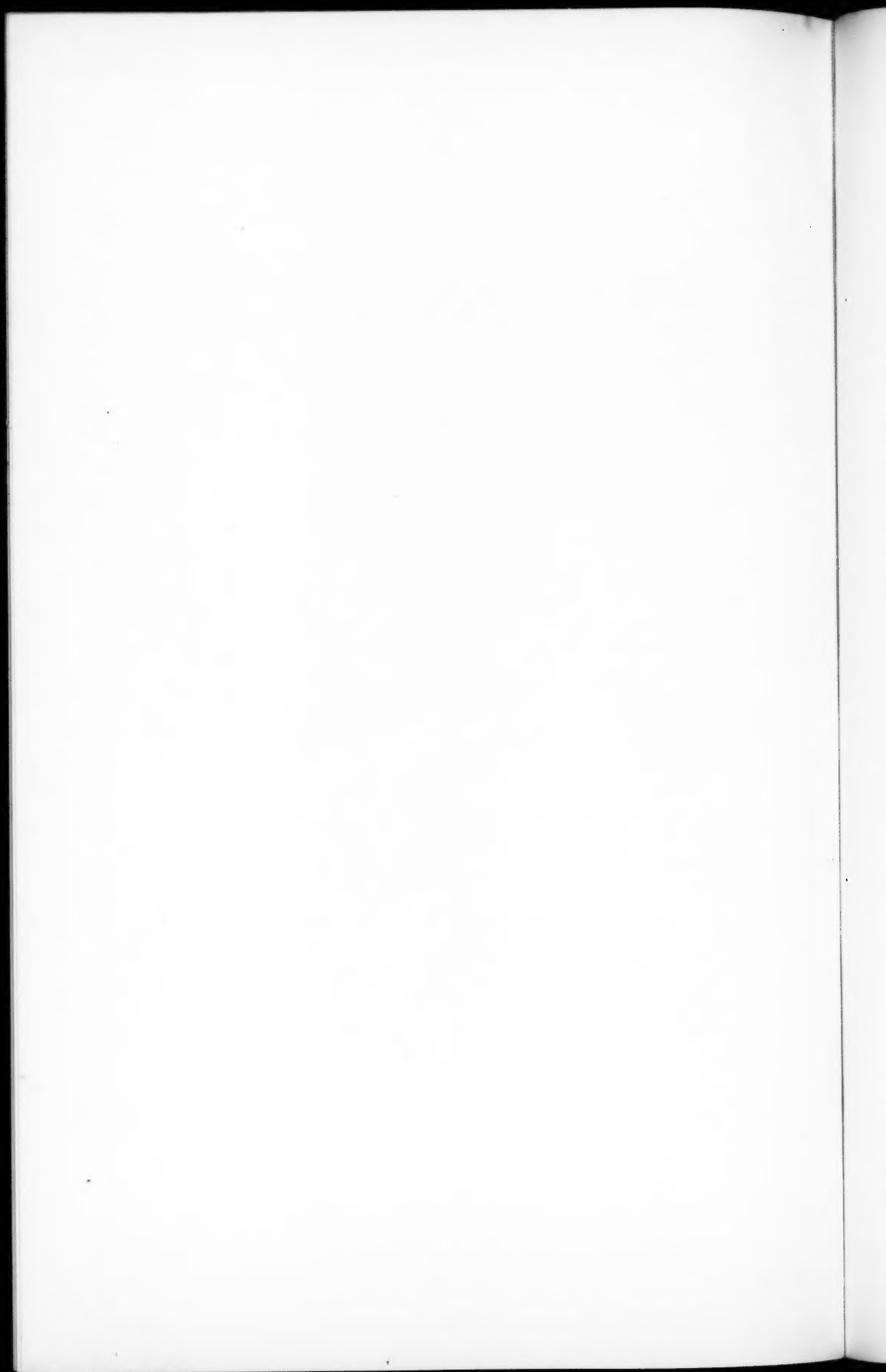
FIG. 1.—Malformation of hands. "Brachydactylia."

Fig. 2.—Malformation of feet. "Brachydactylia." Supernumerary Toes.

FIG. 3.—Congenital dislocation of patella.

of the radius. His ancestors were German. His parents, two sisters, two brothers, and all his relatives are normally formed, excepting one first cousin, who has six toes on one foot. He is five feet high, of fair intelligence, is dolicocephalic, has a slight exophthalmos, brows slanting upward in Mongolian fashion, and a high arched palate. All the digits of both hands and of both feet are abnormally short, being about two-thirds the normal length. All the fingers of both hands except the index and little, which each have two phalanges, have three bones, as shown by the skiagraph. By palpation only two bones can be distinguished in each finger. Each thumb exhibits three irregularly shaped bones and a sesamoid in place of the phalanges. The ring and middle fingers of the left hand are webbed to the end of the proximal phalanx. Each foot has six toes, all of which are webbed, and each toe has two phalanges. The accessory toe has two large phalanges and a small metatarsal bone which articulates with the internal cuneiform. The internal cuneiform bone is larger than normal and projects well below its usual level. The middle and external cuneiform bones cannot be seen in the skiagraph, the two middle metatarsal bones apparently articulating with the scaphoid. The patient has knock-knees, and when standing the patella rests on the external sur face of the external condyle, the internal edge looking forward, the anterior surface facing outward. When the leg is flexed the patella passes farther outward and backward until it touches the head of the fibula. The skiagraphs were made by Dr. Francis Allen, of the Pennsylvania Hospital.

TRANSACTIONS

CHICAGO SURGICAL SOCIETY.

Stated Meeting, December 7, 1903.

The President, E. WYLLYS ANDREWS, M.D., in the Chair.

KELOID TREATED BY X-RAYS.

DR. WILLIAM M. HARSHA presented a young man, eighteen years of age, who had a small growth behind the right ear for ten years; when it attained the size of an ordinary marble, five years ago, it was excised; the skin was loosened up around it, and primary union was obtained; but in three or four months the tumor was as large as ever. It grew to be twice the size it was formerly. Examination showed the characteristic histological formation of keloid. It was removed three times at intervals of a year or a little more, the last time about two years ago, then it had grown a little larger than it was previously. X-ray treatments were then begun and were given at intervals of two or three days, but were not regularly kept up. He had not had frequent treatments by the X-ray in the last six months. The growth now showed not more than one-sixth of its size when the treatment was begun; it was still getting smaller.

DR. A. J. OCHSNER said that the treatment of keloid by means of the X-ray was worthy of a good deal of attention. In several cases in which this treatment had been used, in which the keloids had been removed, and had gotten worse after removal, the improvement was very marked afterwards by the X-ray treatment. In one of the cases the keloid diminished to a very slight thickening, so that before removing any keloid now one should treat it thoroughly with the X-ray.

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PANCREATIC CYST.

DR. HARSHA reported the history of the following case: A man, twenty-nine years of age, developed typhoid fever, beginning October 10, 1901, which lasted ten weeks. Before recovery was complete, a tumor appeared above the level of the umbilicus, to the left of the median line. When first discovered it was the size of the fist. It continued to increase in size and to extend until March 20, 1902, when it completely filled the abdomen except the right inguinal region. Fluctuation was plain, the contour smooth and almost symmetrical. Abdomen tense with very slight tenderness, temperature reading at 100 at times. Constipation obstinate, once or twice formidable obstruction of the bowels was present. Most prominent part of swelling on left side a little below the level of the umbilicus. Nutrition was impaired, but patient was not emaciated. Urine normal except somewhat high specific gravity, 1026. There was no jaundice, glycosuria, or fatty stools. April 2, 1902, incision was made and two gallons and a half of fluid evacuated. The first fluid to discharge was serous and amber colored; this fluid was about half the total amount. The remainder of the discharge looked like pus, was odorless and less than the usual consistence of pus. A large tube was inserted surrounded by gauze packing to protect the peritoneum. More fluid drained away during the ensuing week, after which the tube was replaced by gauze. The wound was kept open for three or four weeks, when it was allowed to close. The patient returned to his work apparently well, and soon regained his usual weight.

The examination of fluid was negative. No tubercle, typhoid, or other bacilli or cocci were found. No reaction of pancreatic fluid. Examination by Dr. F. G. Harris, then at Cook County Hospital, and pathologist at the College of Physicians and Surgeons Clinic. The purulent portion appeared like sterile pus.

September 1, 1902, the man came back with a return of the tumor. This time it was about the size of a large cocoanut, now filling the half of the left side of the abdomen. Fluctuation plain, no temperature, loss of weight or other disturbance. Resonance could be made out above and to the left side of the tumor. September 9, 1902, incision was made at site of scar from former operation.

Cyst wall presented, and was followed upward to find the colon above and over the front of it, extending to the pancreas. One-half gallon of fluid was evacuated. The report of examination by Dr. F. G. Harris is as follows:

The specimen was a thick, turbid fluid of a reddish-brown color, containing thicker grayish-brown mucoid masses; on standing, it deposited a grayish-brown sediment in abundance. Specific gravity, 1030; reaction, alkaline; albumen, present; albumen, 17 per cent. Purdy's method; mucin, absent; blood, present; sugar, absent; urea, trace; steapsin, absent; amylopsin, absent; trypsin, absent.

Microscopic examination showed a large number of red and white blood-cells, no concretions, no cholesterin crystals.

Gauze packing was done, and cyst drawn up into the opening in abdomen and incised. The cyst wall was one-eighth of an inch thick; and a start was made to detach the cyst wall proper from the peritoneum, but this seemed so formidable that it was thought best to stitch the edge of the opening to the abdominal peritoneum. A large tube was again inserted. This kind of drainage has been continued. The large cavity of the cyst has gradually diminished in size until the present time.

The patient had uninterrupted recovery after each operation, and is apparently in perfect health. He is now working as a guard on the elevated railway. The wound is irrigated from one to three times per week and is dressed every other day. He had used strong iodine and almost pure carbolic acid in the cavity a few times for its more thorough disinfection, to destroy the secreting surface, and for the purpose of promoting its cure, but had seen no marked benefit. The discharge is little more than from any sinus of this size. No unusual irritation of the wound. The location of the tumor and remaining fistula indicate that the cyst came from nearer the tail than the head of the pancreas. The incision was made at this site because the tumor was more prominent here. (Patient presented.)

In the ANNALS OF SURGERY, February, 1903, in discussing the etiology of pancreatic cysts, Charles G. Cumston says that very little is known about it. He accepts the classification of Körte:

Retention cysts from obstruction of the excretory duct.

Proliferation cysts of the pancreatic tissue.

Retention cysts originating from the glandular vesicles and smaller excretory ducts, the result of chronic interstitial pancreatitis.

Pseudocysts which arise from inflammatory or traumatic lesions.

Robson and Moynihan add congenital cystic disease and hydatid cysts, which latter are also found in other classifications (R. and M., page 189, " Diseases of Pancreas"). They include under the head of proliferation, cysts, cystadenoma, and cystic epithelioma.

The direction of the fistula now points to a part of the pancreas nearer the tail than the head. The more common location of these cysts is above the transverse colon.

Gussenbauer is credited with the first operation of this kind in 1882, *i.e.,* incision and drainage. The mortality after complete or even partial extirpation has been quite high.

In reviewing the subject of operations on pancreatic cysts, Benjamin T. Tilton (ANNALS OF SURGERY, July, 1902) quotes Boeckel's report of 115 cases. In ninety-nine cases operation concluded in one sitting, incision and drainage, with ninety-two recoveries and seven deaths; while sixteen cases operated in two sittings all recovered. Twenty-four cases collected by the same writer of complete or partial extirpation, of this number four died. Owing to the deep and postperitoneal situation and its proximity to important structures, it hardly seems justifiable to attempt extirpation. Operation at two sittings, if infection is suspected, is of course the one of choice.

The fistula in this case has now persisted about fourteen months, and is not due to continued secretion so much as the large cavity and thick walls. It has been injected with tincture of iodine and cauterized with 95 per cent. carbolic acid to destroy the secreting surface, to disinfect and promote its cure. Cases are reported where the fistula remained open several years.

In the section of Nothnagel's practice devoted to diseases of the pancreas, Oser says (p. 181) he has only found in literature 134 cases of pancreatic cyst. He refers to Professor Senn's contribution, and accepts the theory that retention can no longer be considered the chief cause. In this series, diagnosis was made only twenty-seven times (in 134 cases) prior to operation. The ideal operation, of course, is extirpation, but the high mortality

is a strong argument in favor of simple drainage. If this does not cure, extirpation can be more safely done at a later operation, when the size has so greatly diminished.

Dr. L. L. McArthur said he had presented a case of cyst which began in the head of the pancreas, extended down into the pelvis, and became adherent to the bladder, rectum, and intestines, giving symptoms that first attracted the attention of the patient to his right abdomen. On examination, the speaker found a large fluctuating mass, from which by aspiration was obtained a fluid which converted starch into glucose. He therefore decided that the case was one of pancreatic cyst. Operation was performed and the cyst excised.

In regard to these cysts, the treatment which had given the best results, though not the lowest mortality, had been total ablation of the sac, which may have been impossible in the case reported by Dr. Harsha. There was one interesting fact in connection with the ablation of the cyst in the particular case he had, namely, that its origin was so close to the head of the pancreas, that when the stump of the ligated cyst (which was ligated with an elastic ligature) came away, there was a biliary pancreatic fluid and fistula; bile regurgitating from the common pancreatic duct up into the wound and out. However, the patient made a prompt recovery. The fistula did not persist long.

Dr. A. E. Halstead said that he had had an experience with two cases of pancreatic cyst. The first case he saw when he was an interne at the Cook County Hospital. He operated on a case of large pancreatic cyst which occurred in the service of the late Dr. Strong. The wall was extremely thin in this case, so that there was no possibility apparently at that time of removing the cyst. The cyst was therefore opened and drained. The patient, a middle-aged man, recovered.

Another case he presented to the Chicago Medical Society not long ago occurred in an elderly woman. The cyst wall was fully one-quarter of an inch thick, and it contained possibly two quarts of fluid. The cyst was dissected away from the peritoneum very easily, and apparently grew from the tail of the pancreas, because when he removed the cyst a piece of the pancreas came with it. He thought probably in the majority of cases these cysts could be enucleated, and if care was taken in separating the cyst wall from the retroperitoneal tissues, particularly

from the large vessels, like the aorta, there was very little trouble. When the whole tumor was removed, the results were much better than where the cyst was drained.

In his case the patient remained in the hospital about four weeks altogether, and when discharged the abdominal wound was entirely healed.

ACTINOMYCOSIS OF JAW.

Dr. Harsha related a third case, that of a man, fifty years of age, who was referred to him with a probable diagnosis of sarcoma of the jaw. The patient had a swelling of the size of a hen's egg at the angle of the jaw on the right side. He had no temperature, and was in good health in other respects. Family and personal history negative. He had two teeth extracted prior to the beginning of the swelling, which was noted five weeks before the patient consulted the reporter. Whether the extraction of these teeth had anything to do with the swelling he did not know. The swelling increased slowly, was quite hard around the edges, and he thought he could detect a little fluctuation, but was not absolutely sure about this. He suspected actinomycosis, advised operation, which was performed. The tissue was broken down and showed the characteristic appearance of a yellow purulent mass, and around this the tissue was almost as hard as gristle. It was much harder than he expected to find it. There was no connection with the bone or periosteum. The dissection was as thorough as possible; but the wound did not heal kindly. The skin was loosened to make a cover, and as little healthy skin as possible was excised, but the edges became inverted, and at one place underneath broke down, which at a second operation was thoroughly excised. The patient was then subjected to X-ray treatment for a while, shortly after which healing occurred. Iodide of potassium was given for six weeks. The slides showed the characteristic ray fungus, not in the tissue, but in the pus.

He had received a letter from the patient within a week stating that he was entirely well.

Dr. A. J. Ochsner said that in actinomycosis he thought the interrupted treatment was the treatment to use, giving large doses of iodide of potassium, say ninety grains, three times a

day, giving that for a week or three or four days, or as long as the patient would stand it; then interrupting it; then repeating the treatment, interrupted for a week at first, then for a month. In one case of actinomycosis in the region of the parotid gland, in which the disease had apparently entirely disappeared, it returned after a few months and caused œdema of the larynx. When the patient returned again he was almost suffocated. Evidently a small portion of the disease had been left at some point at which it could not be reached by the circulation. In these cases iodide of potash could be carried to a certain point, and as soon as absorption took place down to the parasite, the parasite would begin to grow again. This was the way in which veterinary surgeons treated actinomycosis successfully in cattle. Ninety grains was given three times a day, for at least three days or for a week, if the patient could take it, then was interrupted for a week. This was done two or three times, and then it was given for a week each month, for several months, and recurrence of the disease could be prevented in this way.

XANTHOMA INFANTUM.

Dr. Louis A. Greensfelder reported the case of a boy, aged ten years, from the Jewish Orphan Asylum, who had had no serious illness until two years ago, when he suffered from extensive ringworm of the scalp. This was very obstinate to treatment, but ultimately was cured by the use of the X-ray.

The present affection dated back as far as the patient could remember, but did not cause any concern until the boy sustained an injury of the hand and was brought to him on account of it. No reliable family history could be obtained. The patient had two brothers, who were also inmates of the asylum, but showed no evidences of a similar lesion.

Physical examination of the patient, including a careful examination of the eye, mucous membrane of the pharynx, larynx, nose, and throat, showed absolutely nothing abnormal. Examination of the chest was negative. The liver showed slight enlargement, also the spleen. Blood examination was negative, also urinalysis. The only manifestations of the disease were found on the cutaneous surface and the tendons, chiefly the extensor digitorum communis, extensor hallucis longus, and

tendo-Achilles. On the anterior aspect of the chest were small pedunculated growths, slightly umbilicated, which sometimes might be confused with beginning xanthoma, but are molluscum contagiosum. On the left side was a circular tumor, slightly elevated, soft, velvety, of sulphur color; the centre of which is scar tissue, results of a vaccination. The symmetry of the lesion was quite striking. A tumor on the right arm was removed. The tumor involving the right buttock, also one on left buttock, is characteristic of infantile xanthoma; also characteristic manifestations are in the tendons. The one involving the extensor digitorum communis required the removal of one inch of the tendon, and tendon suturing was resorted to. There is a tumor of both tendo-Achilles and two on each extensor hallucis longi.

The following was the report of the pathologist:

The specimen was fixed in Flemming's fluid and stained by safranin. The epidermis does not show any changes except a flattening out of the epithelial layers caused by the hypertrophy of the derma. The latter is rather cellular. The cells are of a fusiform embryonal type, and they are contained in a matrix of fibres. These are partly ordinary connective-tissue fibres, partly coarse, yellow elastic fibres. The involuntary muscular fibres are also increased, and there are found bundles of them here and there which are not in direct connection with the arrectores pilorum. Fat in larger masses is found in the subcutaneous connective tissue. Many of the cells of the deeper layers of the derma show very fine fat granules stained blackish-brown by the osmic acid of the fixing fluid.

Dr. Greensfelder said that xanthoma was a benign connective-tissue new growth, with subsequent partial fatty degeneration. These tumors were found chiefly upon the portion of the body exposed to trauma and friction, such as the elbow-joint, knees, etc. In this case nine tumors were removed from the anterior surface of the knee, five from the popliteal space, demonstrating the symmetry of the condition.

From the clinical and pathological findings, a diagnosis of the infantile form of xanthoma was made. This form differed from the xanthoma of adults, inasmuch as the condition was usually congenital or occurred early in life. There was no jaundice present. The ordinary form of xanthoma was the xanthoma planum, which usually occurred on the eyelids in

adults. There was the diabetic form of xanthoma. Xanthoma may occur on the mucous membranes of the pharynx, larynx, œsophagus, pericardium, endocardium, and liver. In those cases in adults in which there was jaundice, tumors have been found in the liver.

Dr. Carl Beck had seen one case of marked xanthoma of this form, but not quite so extensive. He had used electrolysis, and had been able to destroy the tumors entirely by that means. He had later used electrolysis in a case of ordinary xanthoma of the eyelids with satisfactory results.

Dr. Greensfelder said he did not think electrolysis would accomplish very much in cases other than those of xanthoma planum. Judging from the reports of cases, electrolysis had been tried in different cases where counterirritations of all kinds had been a failure. The infantile form of the disease differed clinically from the forms of xanthoma planum and xanthoma multiplex of the adult. In the infantile form we had a tumor growing not only in the skin, but evidently growing and involving the tendons and the joints. Often the tumors extended into the joint cavities themselves.

CONSERVATIVE SURGERY IN CRUSHING INJURIES OF THE ARM.

Dr. Daniel N. Eisendrath reported the case of a boy, aged eighteen years, who, one and a half years ago, was admitted to the Cook County Hospital after having had a girder of a bridge weighing forty-six tons fall on the left arm at the foundry of the American Bridge Company. Two men were killed outright in the same accident. When seen by him, immediately after admission, the arm seemed so completely crushed as to necessitate amputation at the shoulder-joint. The extent of the injury was the following: There was a compound comminuted fracture of the left humerus, with extensive laceration of all the muscles on the outer side of the brachial region, and great destruction of skin. In addition, there was a complete crushing injury of the forearm of the same side. Here the ulna and radius were laid bare, and with the exception of a narrow zone of skin on the radial side there was complete destruction of the skin of the middle one-third of the forearm. Examination here showed

laceration of the muscles and tendons on both sides of the fore-
arm, and in addition the ulna and radius were broken in many
places in their middle third. The hand simply hung by a narrow
pedicle from the forearm.

After thorough disinfection, he removed, with the assistance
of the house surgeons, Drs. Cubbins and Lespinasse, all of the
loose fragments of the humerus. When this had been done, two
inches of the shaft were missing. In order to unite the two ends,
it was necessary to drill through the entire thickness of the shaft
in the upper fragment. The lower fragment, however, consisted
for a distance of two inches of cortex only on the outer side, the
inner aspect of the shaft having been removed. A skiagraph
taken two weeks ago showed perfect union, the silver wire still
being *in situ*. Measured from the acromion process to the ex-
ternal condyle, the left injured humerus was one and a half
inches shorter than the opposite. At the time of admission the
speaker thought it useless to try and save the forearm after he
had finished wiring the humerus and packing and suturing of
the wound in the soft parts. He decided, however, on account
of the patient's youth, to attempt saving it. The credit for this
belonged to the house surgeons, who were greatly interested in
the case. He proceeded to wire the ulna and radius after re-
moving the soft parts, which were hopelessly torn, and also many
fragments of bone. Following the operation both wires came
away spontaneously, having probably cut out. There was ex-
tensive sloughing of the soft parts, skin, tendons, and muscles,
but the wound finally healed. The examination of the X-ray
confirmed the appearance of the arm. There was union of the
ulna, but not of the radius, and this caused a permanent prona-
tion position. The patient could use the left arm from the elbow
to the shoulder almost as well as the right. From the elbow
down there was moderate strength. Patient could flex his fin-
gers and extend his wrist somewhat. Taken altogether, the
result was more satisfactory than an amputation at the elbow
would have been, with the use of a hook, which such an opera-
tion would have necessitated. He proposed to improve the pres-
ent condition at some future day by wiring the ununited radius.
The case was an example of how one could save a member
through perfect primary asepsis and the use of conservative
methods.

ULCER OF LEG FOLLOWING TRAUMATIC THROMBO-PHLEBITIS OF LOWER EXTREMITY.

DR. EISENDRATH said that this case was chiefly interesting on account of its probable etiology. Sixteen years ago the patient was caught in the falling of a house and his left leg was held down by a heavy rafter for over an hour before he could be released. The board fell across his groin. The limb from the thigh down began to swell immediately after the injury. There was no fracture or laceration of the skin. About three months later he noticed an ulcer on the outer aspect of the leg at its middle. In the speaker's opinion, there was a thrombosis of either the popliteal or femoral vein wall as the result of the above-described injury, and an ulcer had formed in the same manner as after typhoidal thrombophlebitis. The leg was greatly swollen from the knee down, and there was absence of varicose veins and of any of the evidences of syphilis or tuberculosis.

SPECIMEN FROM SEVEN MONTHS' ABDOMINAL GESTATION REMOVED THIRTEEN YEARS LATER.

DR. JOHN B. MURPHY presented a specimen, accompanied with the following history:

A woman, forty-one years of age, was admitted to Mercy Hospital, November 18, 1903, on account of an abdominal tumor. She gave the following history:

Thirteen years ago she had an attack with sudden onset occurring during the night. The symptoms were: (1) pain, diffused over the abdomen during the entire attack and not more severe on one side than the other; (2) distention of the abdomen, and (3) diffuse tenderness. Patient did not know whether she had fever or not. There was no nausea or vomiting. She was confined to her bed for several weeks. Shortly after the onset of the trouble, her physician found what he thought was an abscess in the right tube. She was treated medically and by local applications for three months, at the end of which time it was discovered that she was pregnant. Operation on the tube was considered, but not performed. Abdomen enlarged for six or seven months, and towards the latter part of this time she " felt life." Motions then ceased, and death of the child was diagnosed.

Labor did not take place then, or at the end of nine months, and abdomen gradually decreased in size until it reached the normal. Soon after fœtal death, a probable diagnosis of extrauterine pregnancy with rupture was made.

Five years later she had a second attack of "peritonitis," and this time the trouble localized itself in the right iliac fossa, after first being general. A third attack occurred three years ago. A fourth occurred in October, 1902, and followed an induced abortion at two months. A fifth attack occurred last April. Patient was sick for three weeks. In July of this year (1903) she had a very severe attack. Pain was at first general over the abdomen, but after two or three days became localized in the right iliac region. The temperature was 103° F. for two weeks. No vomiting. Abdomen distended; patient in bed five weeks. Menstrual period was delayed three weeks in July; then she began to flow (after onset of attack), and it continued for two weeks. Since then and before that time the periods were regular and painless. Three weeks after this attack she passed considerable pus from the bowel for three days. None since. Six weeks ago she developed a temperature of 106° F. and had several severe chills. Pain and tenderness were localized in right iliac region, and she vomited a number of times. Since six weeks ago a pain has been present in the right lower abdomen quite constantly. She has been confined to bed practically all the time since July, 1903. Bowels were constipated all of the time. For the past four weeks the patient has complained of severe spasmodic pain in meatus urinarius, accompanied occasionally by a desire to pass urine. No pain when urine is passed. Patient urinates every three hours during the day and twice at night. No pain during defecation. Some leucorrhœa.

Previous history. One child living, aged eighteen years. Family history negative.

When patient was admitted to the hospital, there was considerable pus in the urine, but no pus in the stools. Rectal examination was negative. On examining the abdomen a mass was felt to the right of the umbilicus, extending across the umbilical region to the left side. Digital examination showed the presence of a mass close to the anterior abdominal wall just above the promontory, more to the right than to the left side. There was very little abdominal distention, but some tenderness over the

region of the appendix. A mass, hard, round, smooth, and immovable, could be felt just above Poupart's ligament on left side. It appeared to be adherent to the anterior abdominal wall.

During the time she was in the hospital before operation she had considerable pain in the external urinary meatus. No temperature at any time.

Operation was performed on the 24th of November. An incision was made to the left of the median line, through the left rectus muscle. As soon as the abdomen was opened, the foetus immediately presented in the wound. The wound was retracted widely and the incision enlarged considerably so as to thoroughly expose the parts. The foetus was then lifted out of the abdomen. The head rested at upper boundary of the right iliac fossa; body extended upward and to the left. There were no adhesions of the intestines. Adhesions were present between omentum and lower extremities of the foetus to a little above the knees. These were organic and the feet were partially absorbed. The adhesions were ligated and cut off. There was no evidence of a gestation sac except the thin parchment membrane, chiefly comprising the foetus. This was so firm as to fold the parts in close compression, thin and firm as a drawn hood; the arms were folded on the chest, the head flexed on the right shoulder, and the chin adherent to the shoulder. The fingers were perfectly preserved and mummified. No evidence of any connection between the foetus and pelvic organs. After the foetus was removed, the incision was extended downward and the pelvic organs examined. The tube on the right side was found closed at its fimbriated extremity and bound down, but not distended. It was evidently the site of primary gestation. The left tube was free. Springing from the left ovary was an ordinary dermoid of about the size of a fist. This was firmly adherent to the anterior abdominal wall and was inflammatory. The patient did not show any evidence of secondary infection; no abscess cavity was found in any place; dermoid did not communicate with intestine, and foetus was not adherent to the intestine at any point. The dermoid was removed by loosening it from the adhesions to the anterior abdominal wall and to the bladder, to the left side and enucleated from the ovary; opening in ovary closed with catgut. The abdomen was closed without drainage, and the patient recovered.

After the fœtus and dermoid were removed, the appendix was investigated and found to be very materially thickened, the walls indurated and rigid, and the vessels on the peritoneal surface congested; it extended upward behind the cæcum and was very difficult to detach. The appendix was removed. Dr. Murphy thought possibly the irritation caused by repeated traumatisms to the appendix by the fœtal head might possibly have produced the chronic appendicitis which was present, and the acute attacks described in the history.

They were unable to account for the pus from the bowel, as there was no abscess cavity which could have discharged itself into the intestine, the bladder, or ureters, except it was from the appendix. Since the operation, pus in the urine had been very materially decreased, as was shown by the urinary examinations, but still causes some irritation.

POLYCYSTIC KIDNEY.

Dr. Arthur Dean Bevan showed a large polycystic kidney. Polycystic kidneys were almost always symmetrical. Statistics on this point showed that polycystic kidney occurred on but one side in not more than 2 or 3 per cent. of the cases reported. In the great bulk of cases the condition was bilateral, and the conclusion which had been arrived at by operators was that because they were so frequently bilateral they should be left alone. He thought this conclusion was logical. This case, however, was an exception to the rule. The specimen presented was removed from a man about a year ago. The clinical symptoms were those of pain on the right side in the kidney region. He had considerable hæmorrhage and secondary anæmia from the hæmorrhage.

The usual oblique incision was made and the mass exposed. He could not determine the exact character of the mass until he had lifted the kidney tumor out on to the surface of the loin. Only after this had been done was it recognized as a polycystic kidney, and then he thought it was best to remove it. He ligated the pedicle, removed the mass, and had visions of anuria and death in a short time, because this had been the result in such cases. Much to his surprise, the man made an uninterrupted recovery from the operation, and had regained his health and

weight and strength. He now made plenty of urine of the proper quality, and had returned to work in excellent condition.

HYPERNEPHROMA.

DR. BEVAN exhibited a second specimen which was removed from a case of hypernephroma about a month previous. The symptoms were pain, excessive hæmorrhage, and profound secondary anæmia. No tubercle bacilli were found in the urine; no stone was found by the X-ray. A large kidney mass was felt. An exploratory operation was made and a tumor removed, which proved to be histologically hypernephroma. Part of the mass projected into the pelvis like a polypus into the vagina, and was responsible for the very free hæmorrhage which was encountered in the case, with profound secondary anæmia.

At a recent meeting of the Chicago Medical Society, the speaker had made the statement, after saying that he had encountered seven or eight cases of hypernephroma, that in his experience this form of tumor was the most common form of malignant tumor of the kidney. Exception was taken to this statement by one of the discussers. He found, however, that Israel's experience agreed with his own. He had made another statement to which exception was taken, namely, that in his experience they were accompanied by profuse hæmorrhage. The most severe hæmorrhages he had ever seen from the kidney had been in cases of hypernephroma, hæmorrhages where the patient would have profound secondary anæmia, where the bladder would fill up with clotted blood, making it difficult to empty that viscus. He believed that symptoms of any kind did not occur very often unless the hypernephroma had broken through the capsule, and that cases of hypernephroma which came to the surgeon were not, as a rule, of the benign type. They were only infrequently benign. They were the cases in which the hypernephroma had already broken through the capsule and had produced definite symptoms, and these hypernephromas were practically as malignant as sarcoma.

Two weeks after a normal recovery from the operation, the patient had a diarrhœa which could not be checked. One of the internes, Dr. Robinson, investigated the case carefully, examined

the fæces, and found in the fæces pieces of tissue which proved to be hypernephromatous tissue.

Dr. S. C. Plummer reported the case of a man, sixty-eight years of age, who, fourteen months before operation, had a very profuse hæmaturia.   He had never had anything of the kind before.   The patient states that he passed almost pure blood. This alarmed him somewhat, but as he did not pass blood again he did not pay much attention to the first hæmorrhage, which proved to be the only one.   There were practically no symptoms. The patient, about a year later, discovered the tumor himself accidentally one morning before rising from bed, and about that time he was beginning to show symptoms of malnutrition and weakness, but nothing pointing definitely to the kidney.   The tumor which he removed was quite a large one, about eight inches long.   There was practically nothing left of the normal kidney except a very small portion at one end of the tumor mass.   There were three cysts, each of about two ounces in capacity, in connection with it.

PENETRATING WOUNDS OF THE ABDOMEN.

Dr. Malcolm L. Harris read a paper with the above title, for which see page 356.

Dr. E. J. Senn mentioned some statistics which emphasized the importance of Dr. Harris's paper.   These were the statistics of Siegel, taken from the *Bëiträge zur Chirurgie,* 1899, and related to intestinal injuries, showing the great importance of operating early in penetrating wounds of the abdomen where the diagnosis had been made and the peritoneal cavity had been opened.   For instance, in all cases operated upon within four hours from the time of intestinal injury there was only a mortality of 15.2 in sixteen cases.   He thought Dr. Harris's statistics were still better than these.   In those cases that were operated upon from five to eight hours from the time of injury, the mortality was 44.4; in those operated upon from nine to twelve hours after the injury there was a mortality of 63 per cent., showing that these were cases operated upon after perforated peritonitis had occurred.   After twelve hours the mortality was about 70 per cent.

In subcutaneous injuries of the abdomen, where blunt force was applied, it was a difficult matter, in his opinion, to make a diagnosis and to know when and when not to operate. He referred to the case of a woman who fell to the ground, striking on the buttocks. This happened about six o'clock at night, after she had partaken of a hearty supper. She retired seemingly without any symptoms. At twelve o'clock that night she was taken with violent abdominal pains. He saw the case the following day in consultation. An operation was advised, agreed to, and performed. A perforation was found in the lower portion of the jejunum about the size of a small finger-nail. This case showed · how there could be a severe injury without any immediate symptoms, although he thought the mucous membrane in this case might have protruded in such a way as to have closed off the general peritoneal cavity.

In all cases of perforating wounds of the abdomen, he urged prompt operation. If early operation were done, he believed the mortality would be reduced below 10 per cent. in time to come.

DR. ARTHUR DEAN BEVAN said that in the matter of the treatment of perforating wound of the abdomen he was rather inclined to the opinion that the whole problem rested upon the question of time,—the time element and the opportunity of doing an aseptic operation. Where it was possible to do an aseptic operation inside of two or three hours, there could be little doubt but that operative treatment should be employed, and he thought the results obtained by Dr. Harris in his cases supported that proposition, and furnished surgeons with a strong argument in favor of it. As was shown by the statistics referred to by Dr. E. J. Senn, where the patient was not seen for twelve hours after the injury, it was quite probable that the expectant plan was about as good as the operative method. As a matter of fact, in military experience, the poor fellows who had penetrating wounds of the abdomen were not handled, as a rule, until a considerable period of time had elapsed from the receipt of the injury, a sufficient period in which perforative peritonitis could establish itself. Then, too, in military experience the difficulties of giving patients the benefit of aseptic operations were very great.

He agreed with the conclusions of Dr. Harris, but they should be limited, however, to civil practice. He thought we

should have to accept the very careful analyses of the military surgeons of the last two wars, that in military practice, taking all the difficulties into consideration, the expectant plan was the one by force to be selected.

DR. L. L. MCARTHUR thought emphasis should be placed upon prompt interference only under such ideal conditions as would obtain in hospital practice, and of which these patients whose cases had been reported received the benefit. In the cases reported there was undoubtedly a perfect surgical technique in the way of antisepsis and asepsis, and which was ideally carried out. Dr. Harris had everything at hand and a corps of assistants that rendered it possible to invade any part of the abdomen boldly, freely, and safely. These conditions, however, did not obtain in many cases, where the patients were seen not infrequently by a surgeon who was not in hospital practice, or where the patient was kept at home through the desires of the family. Under these circumstances he doubted whether any such results could be obtained.

He asked Dr. Harris if he had employed in bullet wounds of the intestine any particular method of closure, or whether he made his closure to fit the case as occasion required; whether he used, for instance, for a simple round perforation, a puckering-string closure, or the double row Czerny-Lembert suture, and whether he did not believe that in certain abdomens which he opened, although there had been perforation, it was perfectly safe to close them completely.

He was not inclined to the belief that every case of perforating wound of the gastro-intestinal tract required drainage simply because there had been a perforation; but that the decision should be made upon the conditions found, through the escape of infective material or not; inflammatory reaction in the peritoneum or not, and the decision then made. Certainly, he thought it should be as safe to close some of these abdomens as to close, for example, the last two typhoid perforations he had had, in which the typhoid stool filled the abdomen, and yet washing it out with salt solution and closing the abdomen, both of the patients had recovered.

Finally, he asked Dr. Harris to give his opinion as to the advisability of surgical interference after, say, the lapse of time

which Professor Senn had stated, that peritonitis always will have gotten well under way in eighteen hours, or whether it would be better to use the expectant treatment?

Dr. S. C. PLUMMER narrated two cases which had not been previously reported. Both were operated upon promptly. The first case was one of stab wound about two inches above and to the right of the umbilicus, with a small portion of the omentum protruding through it. The wound was enlarged and through it an exploration was made, but no injury found to any of the viscera. The exposed portion of omentum was ligated off, and the patient made an uneventful recovery.

The second case was one of bullet wound, the bullet having entered in the axillary line just below the margin of the ribs, and could be felt through the skin in the median line just below the xiphoid appendix. An incision was made in the median line, the bullet removed, and an examination showed the wound of exit on the upper convex surface of the liver, and lying loose upon the liver, near the wound of exit, was a piece of cloth from the clothing which had evidently been carried in by the bullet and had passed clear through the liver. In this case the abdomen was full of blood. The wound of exit in the liver was packed with gauze; the wound of entrance in the liver could not be reached through this incision, consequently another incision was made just below the ribs, and the wound of entrance in the liver packed. He was not able to stop the hæmorrhage by this means, and the patient died a few hours later from hæmorrhage.

Dr. JOHN E. OWENS said the practice of the surgeons at St. Luke's Hospital, in penetrating wounds of the abdomen, fully bears out the conclusions of Dr. Harris's paper. The mortality was greatest among those cases in which operations, for some reason or other, had been delayed; but in cases that were operated on early, before peritonitis set in, the mortality was very much less, some of the cases progressing to a successful termination.

There were some freaky bullets. Every wound of the abdomen is not necessarily a penetrating wound. He is treating a man who had received a bullet wound in the left buttock, but the bullet was removed from the right side over the appendix,

it having burrowed under the aponeurosis of the external oblique. There were no abdominal symptoms.

He mentioned the case of a policeman whom he saw some years ago. The policeman was asleep in his room, and was partially aroused, but sufficiently awake to find that there was someone in the room tugging at his trousers, which were lying on a chair beside the bed. He jumped out of bed and grabbed a burglar. As they got towards the door, the policeman getting a little better of the man, the burglar's accomplice fired and struck the patient in the abdomen. He examined the abdomen, but symptoms were absent except a slight stinging pain. The pulse was not accelerated. He did not examine the back at the time, but in a day or two did so, and there was a bullet wound to the left side of the spinal column. The bullet was discovered under the skin. It had not passed into the cavity.

He recommended a careful dissection, when in doubt, through the abdominal wall until the peritoneum was reached. If a perforation was found, proceed with the operation, otherwise he would let the case alone.

He saw a man a few years ago who had received two bullet wounds in the abdominal wall. He never had a symptom or any intra-abdominal complication. He was quite interested to know how the man received these two bullet wounds, but the information was not forthcoming. There was no operation in this case, as there were no symptoms requiring it. Perhaps to-day one might be tempted to go into the abdominal cavity, if not for one bullet wound, certainly for two. Still, he did not in this case, and yet the patient recovered. This, however, did not weaken the conclusions arrived at by Dr. Harris.

Dr. Harris, in closing the discussion, said he prefaced his paper with the statement that his remarks would apply entirely to civil practice, as he had not had any experience in military practice, for the purpose of excluding the question of practice in the military service. He thought the subject of the treatment of wounds in military practice was very much confused. Of course, surgeons knew the great disadvantages under which the military surgeon labored,—the difficulty of getting patients early for operation. The secret of success is early operation in these cases.

Hildebrand, who was in South Africa during the war, in an article on the subject, stated that so far as he knew there was not a single case operated under three days. He (Harris) believed, however, that in the future military practice would change materially with the increased facilities regarding portable hospitals, and with drainage surgeons would get better results. The secret of success in these cases would be proper and suitable drainage. He did not think it depended so much on the surroundings of the patient, the hospital operating room, etc., and believed that drainage would largely take the place of them.

As to the kind of suture used, he employed the ordinary suture, not the puckering-string particularly. The wounds were sutured transversely to the axis of the bowel when possible, the first row of sutures taking in all the coats, and this turned in by the usual Lembert suture.

As to drainage, all wounds in which the intestine has been perforated should be drained; not that some of the cases will not recover without drainage, but theoretically, at least, it was impossible to conceive of a bullet penetrating or perforating the intestine without the escape of infective material, consequently every one of these wounds should be considered theoretically an infected wound. He did not know how to differentiate as to which cases would recover without drainage and which would require drainage. It was known that the peritoneum would take care of a great deal of infective material. He had closed some of his cases without drainage, and some had recovered, while others had not. But in the last series of cases he was as convinced as he could be of anything that drainage contributed to the recovery of a number of them. The fact was that every one of these penetrating, perforating wounds of the intestinal tract was theoretically an infected wound. Drainage, therefore, was a very important factor in contributing to the recovery.

As to operating after peritonitis had developed, this was a difficult question to answer. He believed, however, the surgeon would have to exercise his best judgment in the individual case. After peritonitis had set in the chances of recovery were not very good. Personally, however, as a rule, he thought a patient with peritonitis was better if operated on than he was without operation, and, judging from experience in cases of perforative

appendicitis with so-called general or extensive peritonitis, by operating it was found that the percentage of recoveries was constantly increasing.   For that reason he would be in favor of operating on these cases even after peritonitis had developed, as a rule, the surgeon exercising his best judgment.

REVIEWS OF BOOKS.

TREATISE ON ORTHOPÆDIC SURGERY. By ROYAL WHITMAN, M.D., Adjunct Professor of Orthopædic Surgery in the New York Polyclinic. Second Edition. Philadelphia: Lea Brothers & Co., 1903.

If one desires to realize the advancement in this department of surgery during the last thirty years, he should compare the two publications from the Ruptured and Crippled Hospital, New York, that were issued in 1884 and 1903, and that fairly represent the work and practice of that institution.

The first was " Orthopædia," by James Knight, the founder of the hospital and one of the American pioneers in mechanical surgery. This work contains much practical information by which the general surgeon could profit even at the present time. While the lack of pathological knowledge concerning tuberculosis led to strange empirical modes of treatment, yet one can see the dawn of therapeutic principles that now are founded on more definite knowledge of cause and effect. The mechanical deformities of the body are well described, and their treatment, as distinct from deformities due to disease, is well considered, while the book is a mine of historical information. The writer was evidently a reader, a careful observer, and a mechanic.

The later work of Whitman differs from the earlier publication of Knight in being scientific from cover to cover. It is founded on definite pathological knowledge and a wealth of clinical material carefully observed, accurately recorded, and logically considered. All phases of the principal diseases are illustrated by original photographs and X-ray productions in such a successful manner as to add much to the interest and value of the book.

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While the orthopædic specialist will probably view the work as one of the best treatises on this subject, yet it is from the standpoint of the general surgeon and practitioner who does some surgery that we desire to review it. For these members of our profession far outnumber the orthopædists, and, as their clinical results show only too well, are in need of just the kind of accurate and practical information contained in Whitman's book.

The prevention and cure of deformities following inflammations of joints, traumatic as well as tubercular; the proper protection of injured joints in delicate children after the acute conditions subside; the correct application of braces and methods of extension as applied to fractures involving joints,—these and kindred subjects are much better handled in this work than in the general surgeries that crowd our shelves. In the treatment of delayed union after fractures of the lower extremities by methods of fixation, protection, and extension, we can adapt ideas and appliances in common use by orthopædists with much advantage. Too often we are content to consider our work finished when a sprain, a fracture, or joint injury has passed the acute stage, and do but little to restore the limb to functional use. We are satisfied. The patient is not. The irregular practitioner, with the aid of time, adds much to the patient's comfort and to his own credit. A more intimate knowledge of the range and limitations of manipulation, its indications and its methods, is furnished by such a special work as this.

There are certain chapters in the book that will well repay careful consideration. Some deal largely with matters of diagnosis. The one on non-tubercular affections of the spine, when compared with the portion of the chapter on tubercular spinal disease, will prove very profitable. The same statement can be made, with even greater emphasis, concerning similar sections on joint diseases. A knowledge of the diseases there described will better enable one to make a diagnosis by the correct method of exclusion.

The *symptomatic* treatment of abscesses, as compared with the *expectant* plan of the ultraconservative orthopædist, and the *radical* method of some general surgeons will meet with general approbation. Incisions for mixed infections, or for pressure symptoms, and not as routine practice with the vain hope of curing the underlying bone disease, is the teaching of Whitman.

Excisions in childhood are rightly condemned, except under special and rare indications. The arguments are conclusive, but the lesson is not yet well learned by many of us. A study of the late results of excisions for tuberculosis in childhood is recommended to those who are favorably impressed with the operation.

Special attention is also directed to the correction of deformities in spinal disease by the recumbent treatment upon a hyperextended frame, which is advised in comparison to the forcible correction urged by Calot several years ago, because of the marked tendency to recurrence due to the fact that the gap in the bone is not filled in by new tissue. The wisdom of the correction of the deformity in joint disease by traction in the line of that deformity (as advised by Howard Marsh) is well proven and illustrated. This is also not well appreciated by many practitioners.

As would be expected, there is a fine chapter on congenital dislocation of the hip.

A minor subject treated is that of fracture of the neck of the femur in childhood, a condition not recognized because of the lack of typical signs.

Chapter xx, treating of the foot, is the most original portion of the book. It shows conclusively how the weak and flat foot develops from improper physiological use; the correct understanding of which must determine the logical treatment. It begins with a description of the arches with the changes occurring when the foot is used as a passive support, as active lever, and by the strain of improper postures. Showing that the weak foot is due to the persistence of the passive attitude in place of active

muscular action, he deals fully with the symptoms, diagnosis of early types, and the course of the disability until it reaches a rigid abducted foot or the typical flat foot as recognized by all practitioners.

The treatment is that which has been advised in the articles and discussions during the past years by Dr. Whitman, and which is a recognized advance in therapeutic measures. It seems to the writer that there is no reason why these cases are so seldom diagnosed and so superficially considered by many of us, and why certain illogical plans of treatment are advocated, and he earnestly recommends Dr. Whitman's presentation of the subject.

The remarkable accuracy of the book as a whole becomes evident when it is submitted to the test of actual practice.

WALTER C. WOOD.

NOSE AND THROAT WORK FOR THE GENERAL PRACTITIONER. By GEORGE L. RICHARDS, M.D., Fall River, Mass. New York: International Journal of Surgery Company, 1903.

The book is intended as a working guide for the student and practitioner, and as an introduction to the more complete treatises on the subject. It is the author's aim to teach the practitioner how to diagnose the diseases of the nose and throat, and how to treat them successfully and according to modern methods.

The first six chapters are devoted to the anatomy, physiology, pathology, symptomatology, and methods of examination of the nose and throat in general. The remaining chapters treat of the special diseases. No space is occupied with theory, while the practical points are well brought out.

The entire subject is well covered in an elementary way, and the methods of treatment advised are simple, logical, and trustworthy.

PAUL M. PILCHER.

INTERNATIONAL CLINICS. Edited by A. O. J. KELLY, A.M., M.D. Vol. IV, Thirteenth Series, 1904. Philadelphia: J. B. Lippincott Company.

This volume is divided into chapters devoted to treatment, general medicine, surgery, gynæcology and obstetrics, neurology, orthopædics, ophthalmology, and pathology. There are a number of excellent illustrations, and the general character of the volume is the same as the preceding ones.

The chapter on surgery contains an interesting report of a case of interilio-abdominal amputation for sarcoma of the ilium by W. W. Keen and J. C. Da Costa. The authors have also compiled a synopsis of the previously recorded cases. Nineteen cases of this operation are reported, with six recoveries. Sixteen of the operations were done for sarcoma and three for tuberculosis.

This volume is also contributed to by Senn, Albarran, Battle, Coomes, Corner, and Dugan. There are papers on vesical calculus, thrombosis of the spermatic veins, cervical lymphadenitis, sarcoma of the submaxillary gland, syndactylitis, traction injury of the perineal nerve, paralysis of the circumflex nerve, rhachitis, acute osteomyelitis of the os calcis, adenomatous goitre, the radical cure of prostatic hypertrophy, and stricture of the œsophagus. One of the best surgical papers is on the differential diagnosis of acute abdominal conditions which require surgical treatment.

J. P. WARBASSE.